VOLUME 11 • NUMBER 7 • *July 1956*

Geriatrics

DEVOTED TO DISEASES AND PROCESSES OF AGING

VASCULAR DISEASE OF THE LOWER EXTREMITIES

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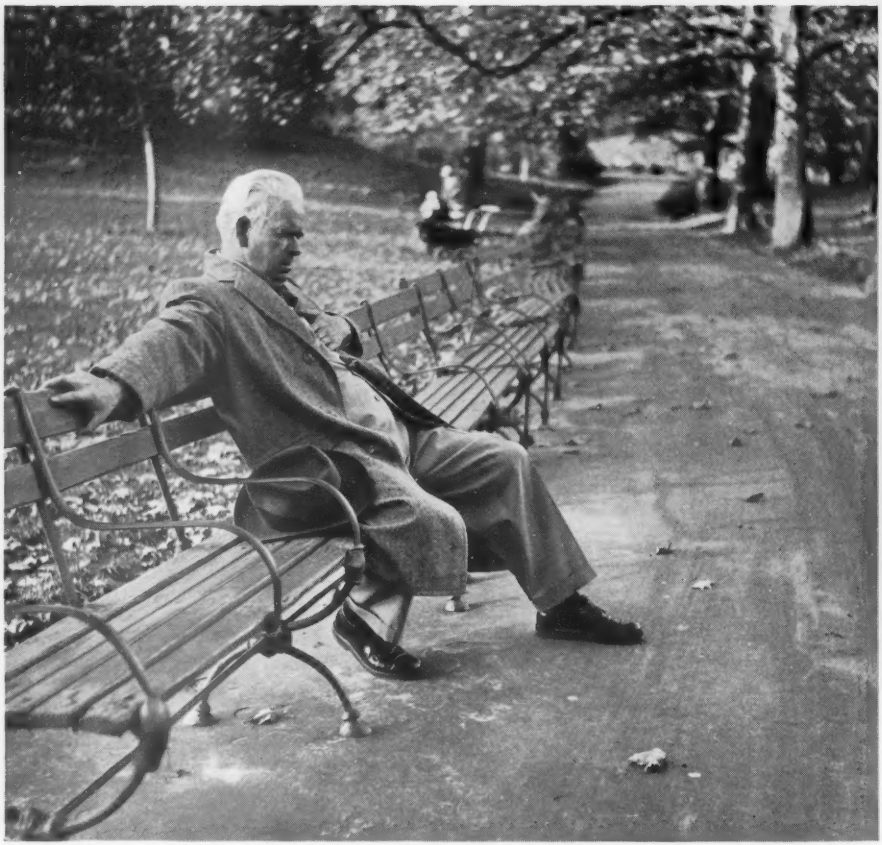

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References: **1.** Rosenberg, H. N., and Michelson, A. L.: Am. J. M. Sc. *230*:254 (Sept.) 1955. **2.** Kory, R. C., *et al.*: Am. Heart J. *50*:308 (Aug.) 1955. **3.** Winsor, T., and Humphreys, P.: Angiology *3*:1 (Feb.) 1953. **4.** Plotz, M.: New York State J. Med. *52*:2012 (Aug. 15) 1952. **5.** Dailheu-Geoffroy, P.: L'Ouest-Médical, vol. 3 (July) 1950.

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Reference: 1. Pocock, D. G.: Personal communication.

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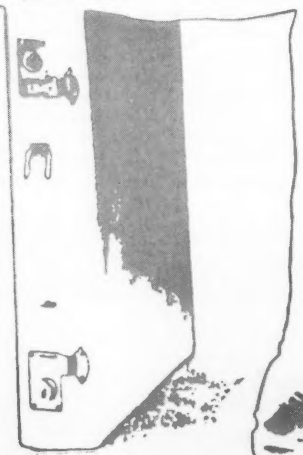

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Geriatrics

Established 1946

Volume 11
Number 7

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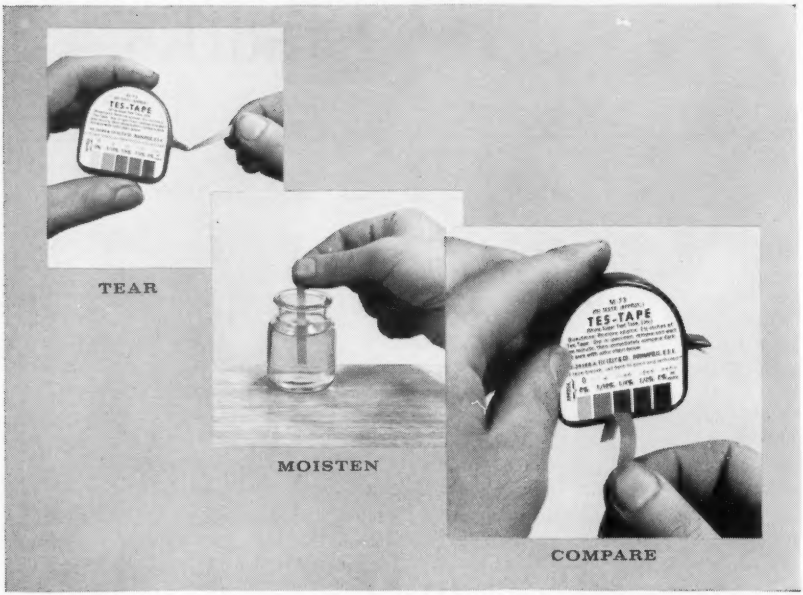

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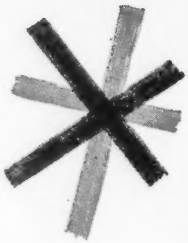

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. . . looking forward

● Osteoporosis results when stimuli to bone production fail to balance bone resorption, says Marc Moldawer of the Department of Medicine of the Harvard Medical School, writing on *The Pathogenesis and Treatment of Senile Osteoporosis* in the August issue of Geriatrics. Of the multiple factors involved in such failure, the diminution in anabolic hormones which occurs with aging can be controlled by replacement therapy with sex hormones, with arrest and partial reversal of the process. Understanding of the other factors can prevent mistaken and sometimes dangerous therapeutic approaches. In particular, immobilization of the osteoporotic patient, and of elderly persons in general, is to be avoided.

● There is often delay in the diagnosis of *Benign Lesions of the Lower Esophagus in the Aged* because the symptoms are too vague for definite diagnosis or else other conditions are diagnosed and treated before the causative lesion is found, according to F. Johnson Putney, associate professor of laryngology and bronchoesophagology at Jefferson Medical College, Philadelphia. Both roentgen study and esophagoscopic examination are necessary in most instances to arrive at the correct diagnosis. In the aged, treatment may be directed toward relief of symptoms by conservative measures. Surgical procedures are not often indicated unless the complaints are unrelieved by medical or conservative treatment.

● A preliminary report on *The Interrelationship Between Cerebral and Coronary Atherosclerosis* is presented by Wei Young and John W. Gofman of the Donner Laboratory, Berkeley; Nathan Malamud and Alex Simon of the Langley Porter Clinic, San Francisco; and Eunice S. G. Waters of the Department of Pathology, Napa State Hospital, Napa, California. They find that there is a highly significant positive correlation between the quantitative degree of atherosclerosis in the major supply arteries and in those of the heart. The observed interrelationship of coronary and brain artery suggests that some general metabolic factor may be important for atherosclerosis development in the brain as it is known to be for the coronary arteries.

● A study of *The Aged Shoulder* was made in 125 institutionalized patients with an average age of 80, by S. M. Albert, D. M. Sklaroff, A. M. Rechtman, and H. Schrayer of the Orthopedic and X-Ray Services, Home for the Jewish Aged, and Albert Einstein Medical Center, Philadelphia. It was found that the calcific deposition in the rotator cuff is more frequent with advancing age and is more prevalent in women; that pain in the shoulder is just as frequent in the group without x-ray evidence of calcification; and that an inert deposit does not adversely affect joint motion. It was not established whether acute, gross trauma contributes to calcific change, but findings would suggest that it does not.

● *Allergy in the Geriatric Patient* may be a new occurrence or may be a carry-over from youth, write Solomon Slepian and Jacob Reicher of the Allergy Service of the Department of Medicine, Jewish Chronic Disease Hospital, Brooklyn, New York. The manifestations of allergic conditions which require the special interest of the physician include: the seeming benignity of allergy in the elderly, the greater hazard to life offered by asthma starting after 40, the difficulties in the interpretation of skin tests, and the occasional onset of severe seasonal hay fever.

For these and other articles, reviews, abstracts, and special features, read every issue of Geriatrics.

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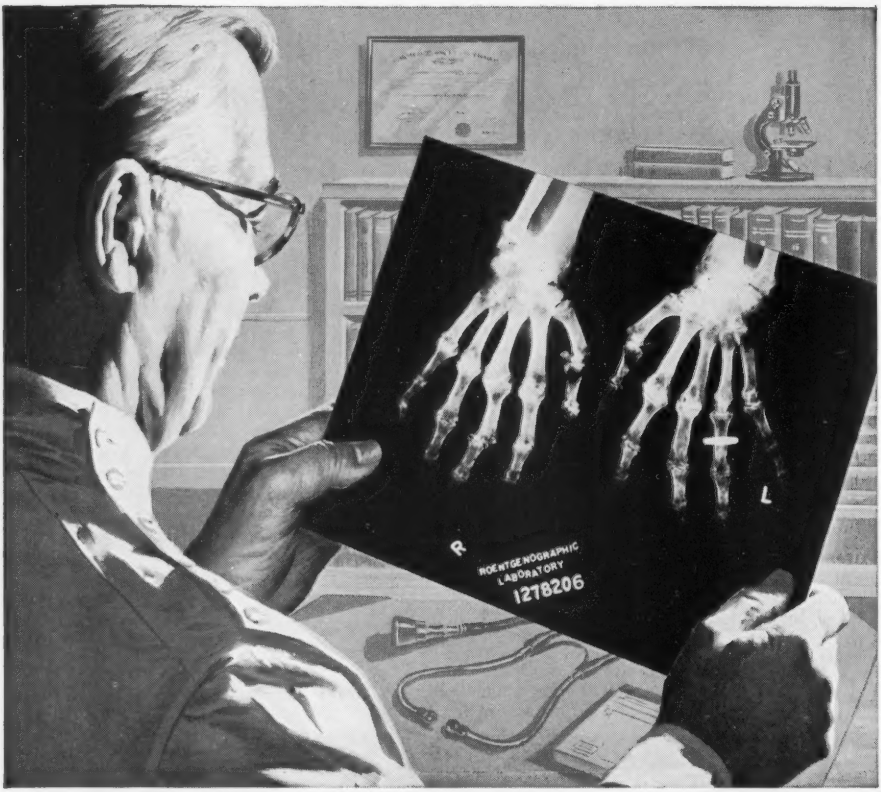

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2. J.A.M.A. 158:386 (June 4) 1955.

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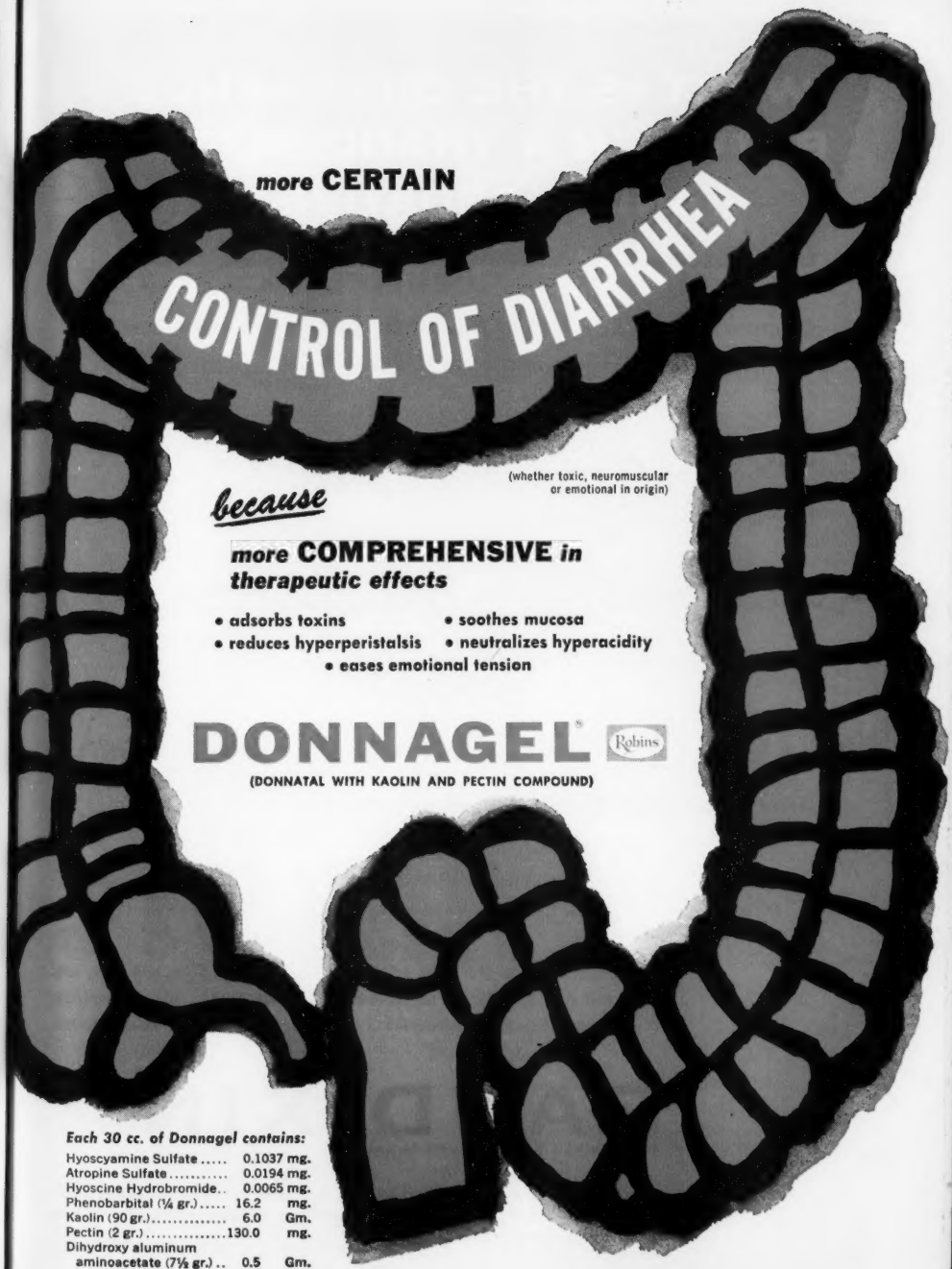

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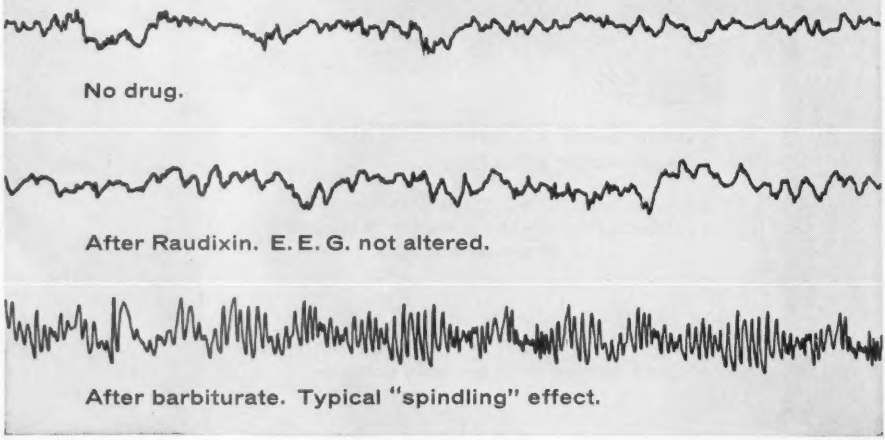

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1. Johnston, T. G., and Cazort, A. G.: J. Allergy 27:90, 1956. 2. Schwartz, E.: New York J. Med. 56:570, 1956. 3. Schiller, I. W., et al.: J. Allergy 27:96, 1956.

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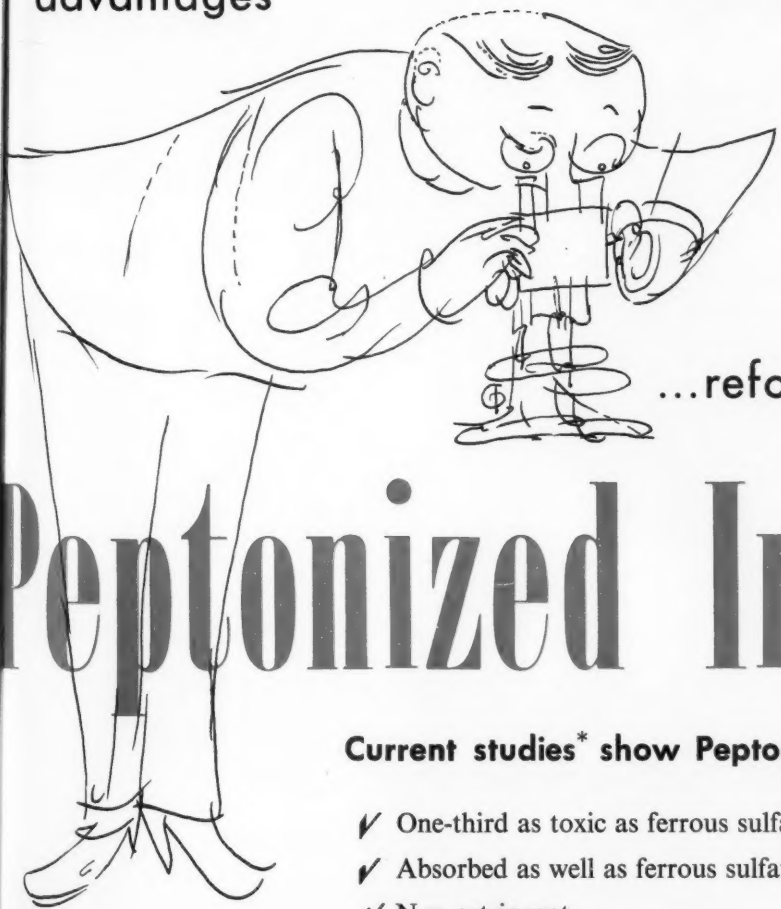

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*Keith, J. H.: Utilization and Toxicity of Peptonized Iron and Ferrous Sulfate, Read before the American Association for the Advancement of Science, Zoological Section, Atlanta, Georgia, December, 1955.

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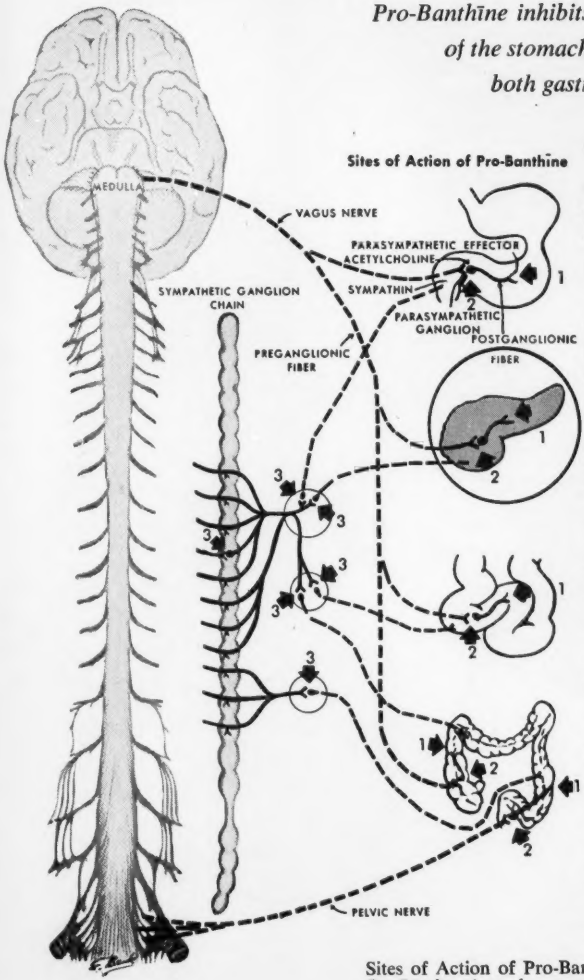

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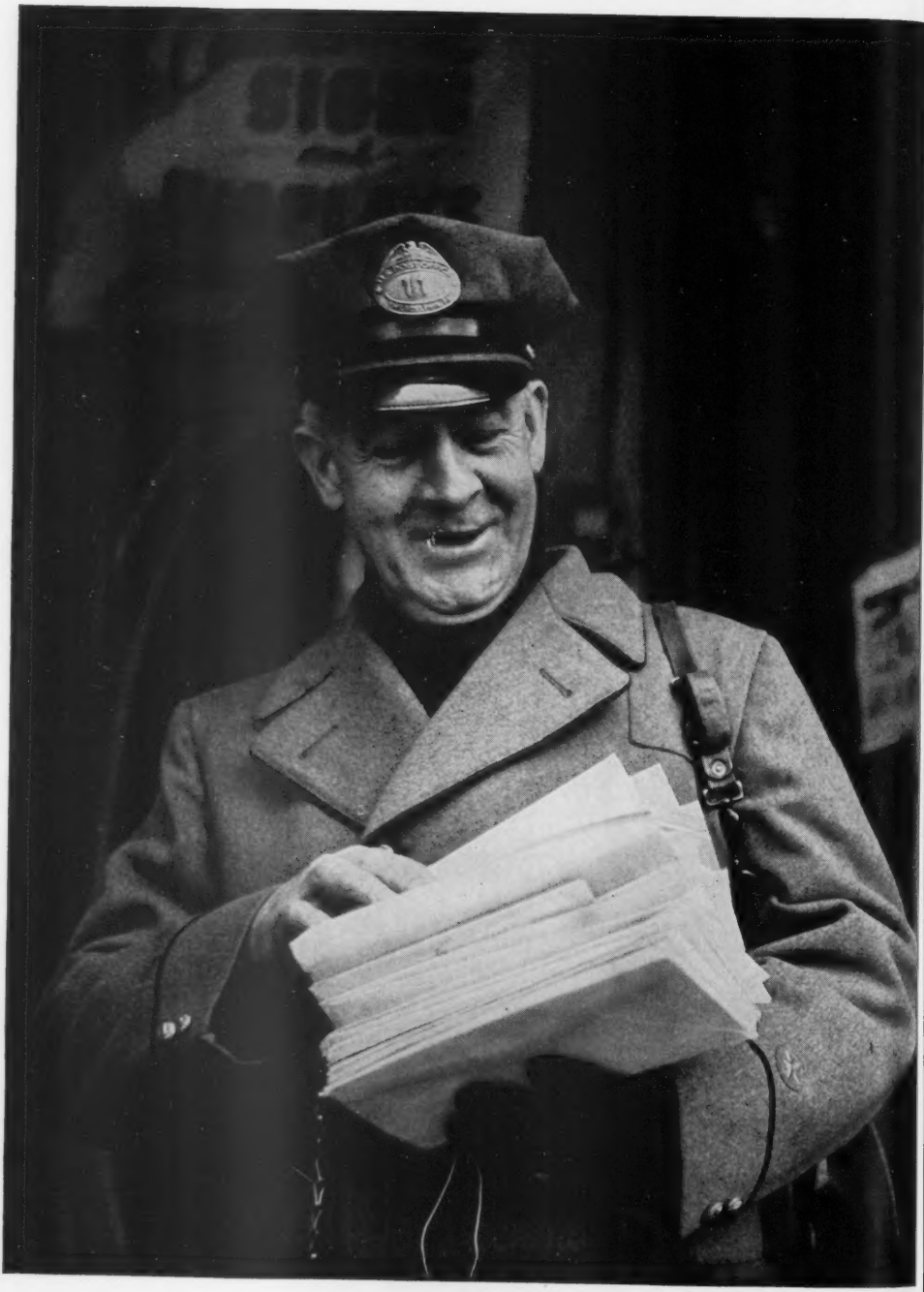

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1. Fazekas, J.F., et al.: J.A.M.A. **161**:46 (May 5) 1956. 2. Mitchell, E.H.: J.A.M.A. **161**:44 (May 5) 1956.

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References: 1. Drezner, H. L., et al.: Am. Pract. & Dig. of Treatment 6:912, 1955. 2. Martin, G. J. (Editor): Hesperidin and Ascorbic Acid. Naturally Occurring Synergists. Basel, Switzerland. Messrs. S. Karger, 1954. 3. Gale, E. T. and Thewlis, M. W.: Geriatrics 8:80, 1953.

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(1) Hanssmann, I. J.: J. Iowa St. M. Soc. 45: 606-609, 1955; (2) Hoobler, S. W.: South Dakota J. Med. & Pharm. 9: 51-58, 1956.

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1. Cass, L. J. and Frederik, W. S.: Malt Soup Extract as a Bowel Content Modifier in Geriatric Constipation. Journal-Lancet, 73:414 (Oct.) 1953.

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References: 1. Rhoads, J.E.: Internat. Abstr. Surg. *94*:417, 1952. 2. Mecray, P., Jr.: Am. J. Clin. Nutrition *3*:461, 1955. 3. Cannon, P.R.: J.A.M.A. *135*:1043, 1947. 4. Halpern, S.L., in Nutrition in Infections, Miner, R.W., ed.: Ann. New York Acad. Sc. *63*:147, 1955.

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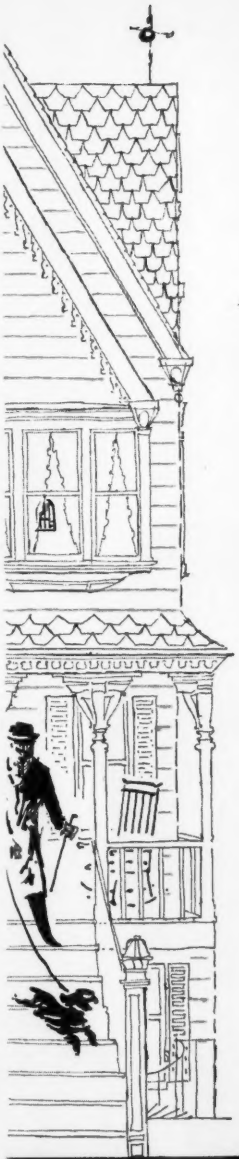

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1. Levy, S.: J.A.M.A. 153:1260
2. Seidel, H., Silver, A.A., and Nagel, H.: J. Am. Geriatric Soc. 1:280
3. Houston, C.S.: New England J. Med. 240:683

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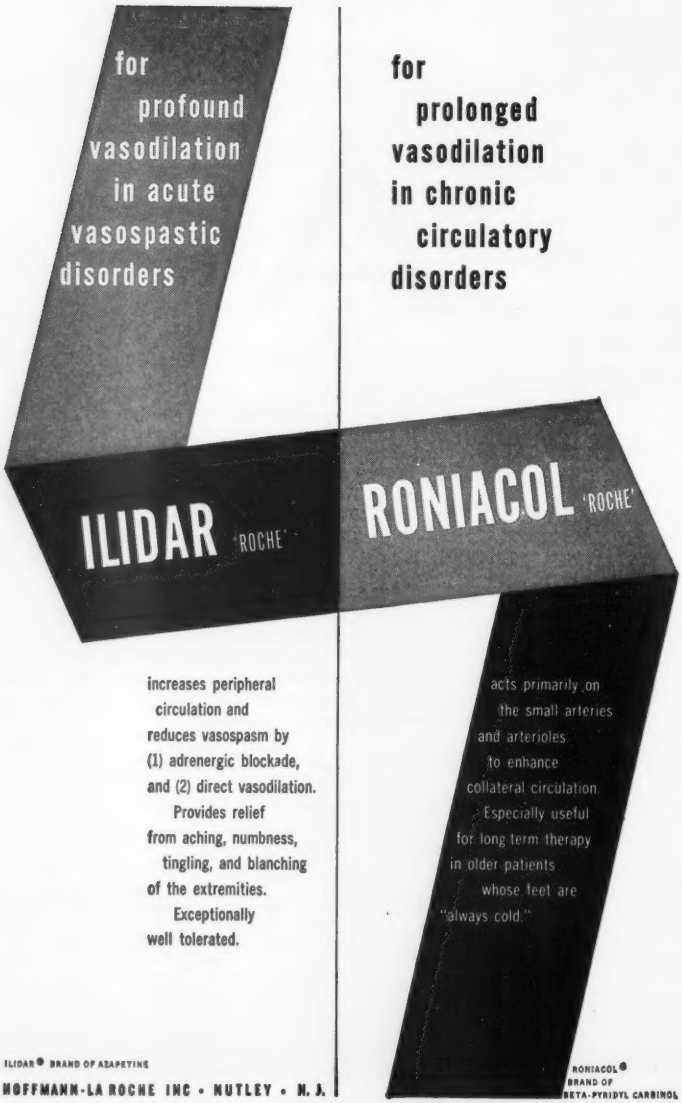
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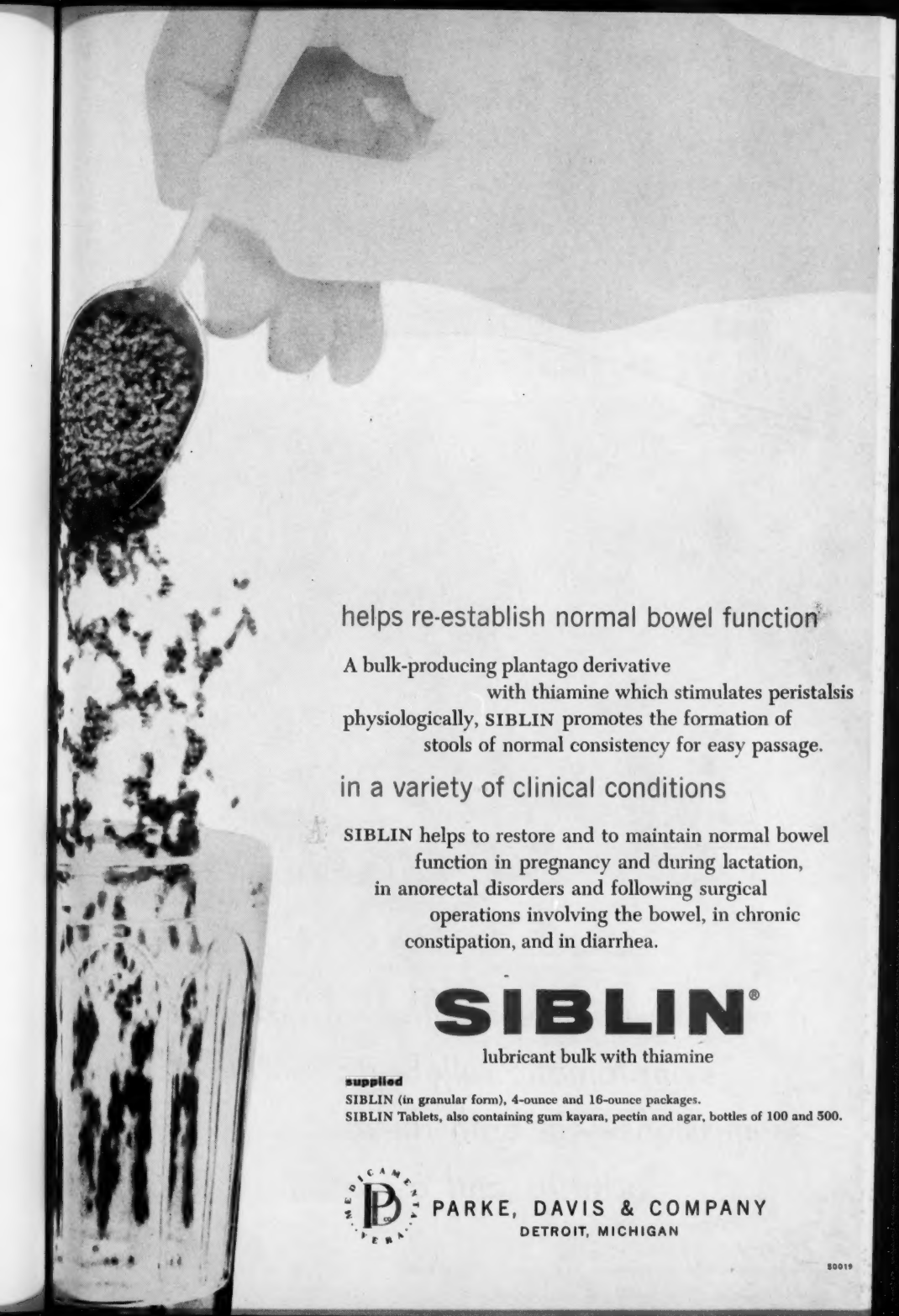

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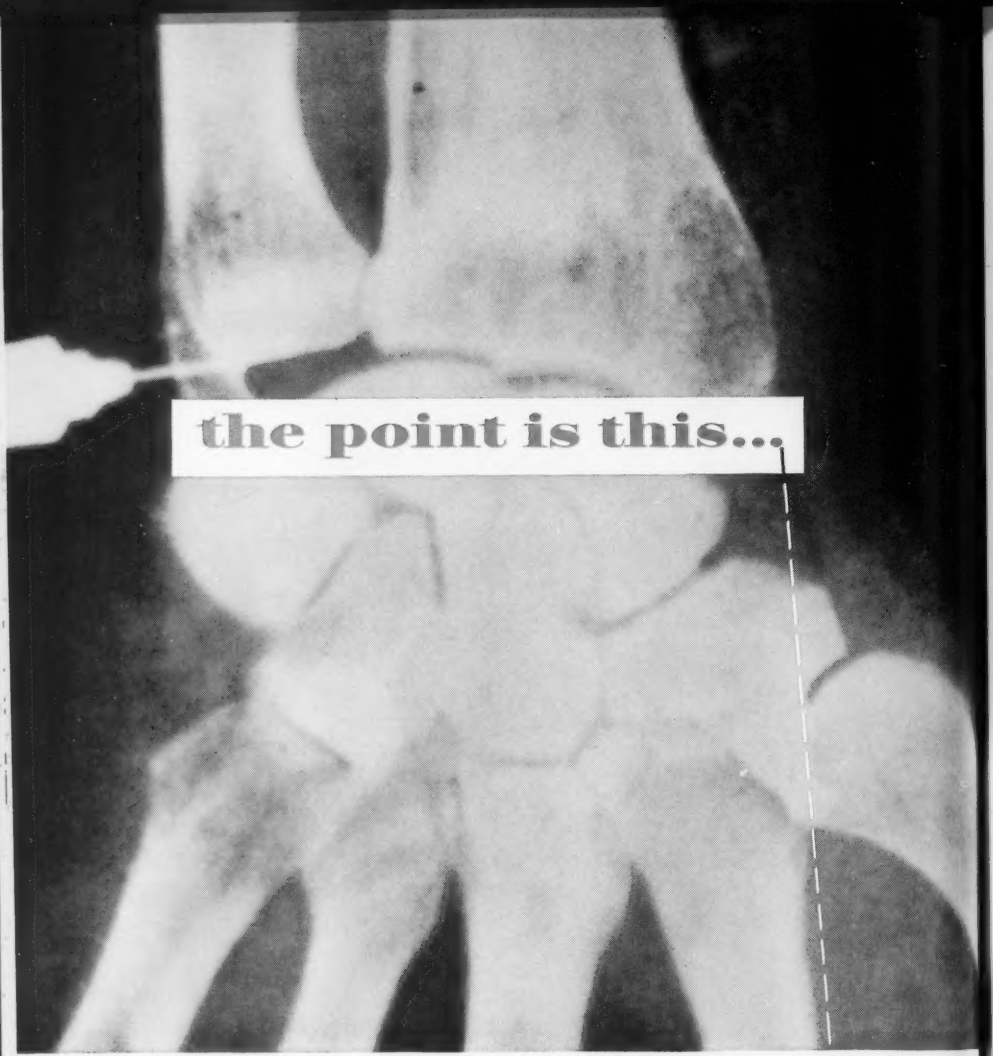

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References: 1. Hollander, J. L., *Ann. New York Acad. Sc.* **61**:511, May 27, 1955.
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1. Vilter, Richard W., Am. J. Clin. Nut., 3:72, Jan.-Feb., 1955.

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LAKESIDE

Volume 11, Number 7 Geriatrics

Diseases of the peripheral veins in the aged

EUGENE L. LOWENBERG, M.D.
NORFOLK, VIRGINIA

The physician who recommends a conservative program for asymptomatic varicose veins in the aged takes a calculated risk that stasis dermatitis, stasis ulceration, acute superficial thrombophlebitis, or even leg ulceration will not cripple the patient's remaining years. The treatment of varicose veins and their complications is presented.

The management of phlebothrombosis of the calf veins and iliofemoral thrombophlebitis in the aged is discussed, including indications for anticoagulant therapy and for surgical intervention.

◆ The incidence of diseases of the peripheral veins increases with age. Often this simply represents neglect catching up with the patient. Varicose veins, asymptomatic for years, may produce severe complications late in life. The average patient who develops acute massive superficial thrombophlebitis in varicose veins has had varicose veins for twenty or more years. Age also predisposes to diseases of the deep veins. Phlebothrombosis and femoro-iliac thrombophlebitis are not rare in the ambulant, apparently healthy, aged patient. Deep vein phlebitis constitutes a real hazard when the aged patient is hospitalized for cardiac disease, for surgery, or as a result of a fracture.

CONTRAINDICATIONS FOR SURGERY

We would not advise every elderly patient with varicose veins to have surgical eradication of his varicosities. If the varicosities are not large and not becoming progressively worse, if they are entirely asymptomatic, and if none of the complications of venous stasis are present, the patient may well be told not to bother the varicosities if they are not bothering him. Elastic supports may be prescribed as a further assurance that the condition will be held in check. The pa-

EUGENE L. LOWENBERG *is chief of peripheral vascular disease service, Norfolk General Hospital, and civilian consultant at U. S. Naval Hospital, Portsmouth, and U. S. Public Health Hospital, Norfolk.*

tient is instructed to avoid prolonged standing and to take one or two rest periods a day in the recumbent position with legs moderately elevated. In adopting a conservative program for asymptomatic varicosities in the aged, we are taking a calculated risk that stasis dermatitis, stasis ulceration, acute superficial thrombophlebitis, or leg ulceration will not develop.

Sclerotherapy is not recommended as a definitive treatment of varicosities of the aged. If the varicosities are asymptomatic, the simple measures suggested are adequate. If the varicosities are large, sclerotherapy will result in thrombosis of the varicosities rather than sclerosis. The benefits will be temporary as the thrombosed vein will rapidly recanalize. Furthermore, injection of varicose veins in this aged group without a preliminary saphenous ligation is probably a little more risky than in younger people.

INDICATIONS FOR SURGERY

When the varicosities are large, when they cause leg discomfort, when stasis dermatitis is resistant to treatment, when stasis ulceration is present, the patient is entitled to surgical relief. The surgery envisioned is radical and extensive but, if skillfully performed, is readily handled by the aged patient without morbidity or mortality. Factors increasing the safety of saphenous vein surgery for the aged are:

- The anesthesia may be very light, or, even better, low spinal or unilateral spinal anesthesia may be used.
- Early ambulation is part of the postoperative program and readily put into effect.
- The necessary incisions are usually short and thus heal nicely.
- Blood loss may be held to a minimum by special technic.

Large varicosities increase the total vascular bed and probably increase the work load of the heart in transferring blood from the venous to the arterial side of the vascular system. It is to be presumed that radical cure of large varicose veins in the aged may not only rid the patient of his varicosities and the complications thereof but also lighten appreciably his cardiac load.

EVALUATING THE AGED PATIENT FOR SAPHENOUS VEIN SURGERY

We feel that the aged patient who leads a normally active life for his age, who has no dyspnea on exertion, and who has a negative systemic history will tolerate saphenous vein surgery very well. However, it is our practice to rely on a complete examination by a capable internist before accepting the patient for surgery. The internist's study usually includes, in addition to the complete history and physical examination, an electrocardiogram, a blood sugar test, a nonprotein-nitrogen blood test, and a phenolsulfonphthalein renal function test. If the history suggests residual urine or prostatism, a urologic consultation is requested. A simple saphenous ligation and stripping procedure may easily result in complete urinary shutdown in the presence of prostatic hypertrophy, as shown in the following case history.

The patient, a 70-year-old man, was hospitalized for recurring episodes of acute spontaneous thrombophlebitis in enormous varicosities. Long, saphenous ligation and stripping were performed bilaterally under spinal anesthesia. The patient was unable to void after the surgery and an indwelling catheter was inserted. Numerous attempts were made thereafter to leave out the catheter but, in spite of various medications and forced ambulation, the patient was unable to void. Urologic consultation revealed median bar prostatic obstruction. A transurethral prostatic resection became necessary before the patient could be discharged from the hospital.

Medical disabilities such as hypertension, diabetes, or asthma are not considered contraindications to saphenous vein surgery in the aged. Peripheral arterial insufficiency is a definite contraindication, as will be shown.

A previous episode of coronary thrombosis does not exclude saphenous

vein surgery if cardiac reserve is good, but the operation should be deferred for at least six weeks after the cardiac attack.

EVALUATION OF THE PERIPHERAL ARTERIAL CIRCULATION

When a patient is referred for enormous varicosities it is easy to forget about the peripheral arterial circulation. However, in the older age group, careful evaluation of the arterial circulation to the extremity is imperative. When there is an appreciable reduction in arterial circulation, saphenous vein surgery may result in delayed healing of the incisions, initiate areas of gangrene, or even lead to leg amputation, as shown in the following history.

The patient, a 62-year-old man, was seen in consultation because of unhealed surgical wounds. The initial surgery consisted of a saphenous ligation and stripping, Kondoleon's operation, excision of a stasis leg ulcer, and skin graft. The skin flaps of Kondoleon's procedure had sloughed, and the initial skin graft had died. Two subsequent attempts at debridement and skin grafting had also failed. Examination at the time of consultation revealed absence of pulsations in the dorsalis pedis and posterior tibial arteries. A good popliteal artery pulsation was present. Arteriogram showed an occlusion beginning in the lower end of the popliteal artery. The opposite limb also showed evidences of considerable arterial insufficiency. It is to be presumed that arterial insufficiency existed in the operated limb before the operation for varicosities and stasis ulceration. Thigh amputation was recommended. The patient recovered after some delay in healing of the amputation stump.

The importance of excluding peripheral arterial insufficiency before undertaking saphenous vein surgery in the aged is apparent. Claudication is one of the most reliable symptoms in medicine. If the patient has to stop walking because of pain in the foot or leg, arterial insufficiency is surely present. Varicose veins cause cramps in the limb at night and discomfort on prolonged standing. The discomfort is relieved, not aggravated, by walking. Good peripheral pulses, normal oscillometric readings, and absence of a history of claudication are prerequisite to saphenous vein surgery.

Although any significant degree of arterial insufficiency contraindicates saphenous vein surgery, patients evidencing a slight degree of peripheral arterial insufficiency may have their veins eradicated if attention is given to both arterial insufficiency and varicosities. We have helped many patients suffering from early arterial insufficiency by a simultaneous lumbar sympathectomy and saphenous vein ligation and stripping.

TYPE OF SURGERY RECOMMENDED FOR VARICOSITIES IN THE AGED

Our standard treatment of varicose veins has become high ligation plus removal of the main stem of the long and short saphenous system and all of its varicose branches. We feel that, if the aged patient is to undergo surgery at all for his varicosities, he should have the type of operation that will effectively cure his condition. Simple high ligation followed by sclerotherapy has been found to be wholly inadequate. Multiple ligations not only fail to help the situation but actually stimulate the development of more extensive varicosities and render a second procedure a most difficult proposition. Thorough removal of each varicose vessel is almost as important as a high and radical saphenous ligation itself. This is accomplished by painstaking work with internal and external strippers. In aggravated cases of varicose veins, the operation preferred is to make long incisions from groin to knee and knee to ankle, then to turn back the skin flaps and, under direct vision, remove the subcutaneous tissue, the varicosities, and the perforator veins. In contemplating this latter procedure in the aged, one must be sure there is no significant primary arterial insufficiency and also that there is no small vessel cutaneous arterial insufficiency lest the skin flaps necrose.

The treatment of varicose veins should be individualized and the management of each case should be based on the findings and presumed pathologic physiology.

Marking of the varicose veins with 20 per cent silver nitrate prior to the operation lends thoroughness to the procedure.

PREVENTION OF SHOCK IN SAPHENOUS VEIN SURGERY

Although we are not concerned with surgical technic in this paper, a few practical points are in order. In saphenous vein surgery, some blood loss is to be anticipated and, since the aged patient tolerates this poorly, he goes to operation with blood available for transfusion. Blood is replaced as lost. Blood loss may be minimized by the gentle use of the external strippers, by making additional incisions whenever branches or communicating veins are encountered, and by definitive ligation of the communicating veins rather than separation by evulsion.

Perforator veins are especially apt to be found in relation to cirsoid masses of varicosities or at a site of sudden increase in size of varicosities. When the internal strippers are used, all large varicose branches of the long and short saphenous system are disconnected from the main line and stripped individually or resected before the main line is pulled out. The last rather than the first stripping procedure is the main line and this is done with the leg elevated high. One is thus able to apply at once sterile Ace bandages from toes to groin to stop bleeding. Five minutes or more later these bandages are removed and the subcutaneous tracks irrigated with saline solution. Manual expulsion of blood within the tracks is done with great gentleness and only when the wounds are open, so as to lessen the danger of pressing clots through the perforator veins or branches and thus causing embolism. After the incisions are sutured, the Ace bandages are reapplied.

POSTOPERATIVE ANTICOAGULANT THERAPY

In former years the incidence of pulmonary embolism following saphenous vein surgery was high. Better surgery and early ambulation have lessened this tendency. We feel that the patient undergoing saphenous vein surgery is entitled to the added protection of anticoagulant therapy and routinely include it in our postoperative orders. When the operation has been unduly traumatizing, the anticoagulation therapy is initiated with heparin and maintained with dicumarol. Heparin, 50 mg. in 20 cc. of sterile distilled water, is given intravenously four, eight, and twelve hours postoperatively. Thirty milligrams of undiluted heparin are given subcutaneously every four hours during the night. The dicumarol is given as soon as postoperative nausea has passed, usually beginning with 250 mg. Heparin is discontinued after the first twenty-four hours. Daily prothrombin times are taken and on these the dicumarol dosage is predicated. The patient leaves the hospital on the fourth to the seventh day with a prescription for dicumarol to be taken in gradually diminishing doses. We have not had a fatal pulmonary embolism on this regime in a series of well over 1,000 saphenous vein ligations and strippings. There has been an occasional incidence of postoperative phlebothrombosis in the deep veins but this has always responded readily to stepped-up anticoagulant therapy.

SPONTANEOUS THROMBOPHLEBITIS OF THE VARICOSED SAPHENOUS VEIN

Idiopathic acute thrombophlebitis is a common complication of varicosities of the aged. The condition occurs more frequently in very large varicosities in which venous stasis is pronounced. Often varicosities which have been asymptomatic for years suddenly, for no appar-

ent reason, become involved in an inflammatory process with local redness, tenderness, hardness, and surrounding cellulitis. The thrombophlebitic process may subside spontaneously, may gradusually ascend to the femoral saphenous junction, or may spread through the communicating veins into the deep venous system with all the dangers thereof. Combined superficial and deep vein thrombophlebitis is far from rare. If there is deep calf tenderness, tenderness along Hunter's canal, or a positive dorsiflexion test, such a situation may be presumed to exist. If pulmonary embolism has occurred in the presence of clinical, surface vein thrombophlebitis, a complicating, latent, deep vein thrombophlebitis probably exists and is the cause of the embolism.

A 70-year-old man, a cardiac patient, had had varicose veins for years, when an area of redness, tenderness, and hardness appeared along the course of the great saphenous vein in the thigh. He was hospitalized by his family physician and treated with warm compresses to the inflamed lesion. Several days after hospitalization, shortness of breath, cough, and expectoration of blood developed suddenly. Our diagnosis was pulmonary embolism secondary to latent deep vein phlebitis and clinical surface vein thrombophlebitis. The patient recovered after surgery on both saphenous and femoral veins, following the procedure which will be described.

Immediate surgery is recommended as the treatment of choice for acute spontaneous thrombophlebitis in the varicosed saphenous vein of the aged for three reasons. First, it brings to an abrupt end the inflammatory process. Second, the slight element of grave danger is eliminated. Third, the patient is once and for all rid of his varicose veins.

The operation performed consists of a high saphenous ligation plus removal of the varicosed saphenous system including the thrombophlebitic area. We do not hesitate to strip out the inflamed thrombosed vein or to incise or excise it. The inflammatory reaction is entirely nonbacterial and aseptic.

If concomitant deep vein thrombophlebitis is suspected or if pulmonary embolism has occurred, the operation should include an exploration of the superficial femoral vein in addition to the saphenous vein surgery. The saphenous vein is ligated at the femorosaphenous junction, the superficial femoral vein is opened, the thrombus extracted, the vein divided, and regional heparinization instituted through a polyethylene catheter tied into the upper end of the ligated superficial femoral vein.

The patient, a 72-year-old woman, was hospitalized on November 10, 1954. Four weeks before, while she was at home, she had had a stroke involving the right side, with partial paralysis of arm and leg. One week before admission, she suddenly became short of breath and experienced discomfort in her chest. On the day of admission she began to spit up blood. The day after admission to the hospital, she was observed to have a tenderness along the course of the great saphenous vein extending to within 3 cm. of the groin. In addition, the whole leg was moderately swollen and there was tenderness in the calf.

Preoperative diagnosis was pulmonary embolism, deep vein thrombophlebitis, and acute saphenous thrombophlebitis. During an operation on the left side, the saphenous vein was found to be occluded with thrombus. The anterior wall of the saphenous vein was incised and the thrombus removed peripherally. The anterior wall was incised upward to the femorosaphenous junction, the thrombus removed from the upper end of the saphenous, and the saphenous ligated flush with the femoral. When the left superficial femoral vein was exposed, it was also found to be occupied by a red thrombus. It was incised transversely and suction and gallstone forceps were used to remove a large thrombus which apparently extended up the iliac vein. After many efforts, a good back flow was obtained. We felt that the clot had been completely removed from the femoral and iliac veins. A plastic catheter was tied in the upper end of the femoral vein and continuous regional heparinization started. The patient made an uneventful recovery and the catheter was removed on the third postoperative day.

Bed rest seems to prolong and perpetuate spontaneous thrombophlebitis in the varicosed saphenous. Days or weeks may

go by with the inflammation continuing and the thrombotic process gradually spreading. If any medical treatment is to be instituted, it should be in the form of continued ambulation. An active flow of blood should be maintained in the uninvolved veins and particularly in the deep veins. Unna's paste boot or elastoplast bandage and short strips of adhesive over the inflamed vein add comfort to the patient. Often we prescribe anticoagulant therapy on an ambulatory basis. This, of course, is done under laboratory control.

STASIS DERMATITIS

The atrophy and drying of the skin that accompany age seem to predispose to dermatitis. When this condition develops in the lower extremities in the presence of large varicosities, it is often impossible to cure the dermatitis without eradicating the varicose veins. This is so even though the varicosities cannot be incriminated as the sole cause of the dermatitis.

We feel that symptomatic stasis dermatitis in the aged is an indication for saphenous vein surgery, so long as the patient understands that treatment along dermatologic lines must be continued even after the eradication of his varicosities.

VARICOSE LEG ULCERS

It is well to remember that, no matter how bad a leg looks from superficial vein disease, there is a normal leg at the muscle level. If arterial insufficiency can be excluded, the worst stasis ulcers of the aged can be cured. I prefer radical surgery for all except the most superficial varicose ulcers. The saphenous vein is ligated and its main trunk and varicosed branches are removed by stripping or excision. The ulcer, the surrounding diseased skin, the underlying fibrosed subcutaneous tissue, and the fascia are excised. The resulting defect is covered with a split-thickness graft —.001-inch—taken from the thigh. As a rule, this results in placing normal skin on normal, well vascularized muscle or occasionally on healthy tendon sheaths. The aged patient stands this type of surgery well and, the more extensive and radical the surgical debridement, the better are the results.

When moist dermatitis complicates the stasis ulceration or when there is some slight arterial insufficiency, a lumbar sympathectomy is performed at the same time as the saphenous vein surgery and the excision of ulcer and graft. This is made safe for the aged patient by employing unilateral low spinal anesthesia.

CHRONIC INDURATED CELLULITIS AS A COMPLICATION OF VARICOSE VEINS

A thoroughly documented procedure for chronic indurated cellulitis in the presence of relatively normal skin is Homan's modification of Kondoleon's operation. In this operation, an incision is carried the length of the lower leg through the skin, indurated subcutaneous tissue, and fascia. The flaps are turned back and pared of the subcutaneous tissue, then fascia and skin are resutured. This type of operation is definitely contraindicated in the aged patient. Small vessel disease is frequent even in the presence of good pulsations in the dorsalis pedis and posterior tibial arteries, and skin flaps cannot be developed without necrosis. Such arterial insufficiency is particularly apt to be present in diabetes and hypertension. If pronounced disability forces operation, the surgery recommended is wide excision of the involved skin and extensive skin grafting. The grafted skin will invariably take on muscle if there is a good flow of blood in the main arterial vessels, whereas skin flaps will fail to survive.

A 65-year-old Negro woman had varicose veins, a stasis ulcer above the internal malleolus, and chronic indurated cellulitis involving the mesial side of the leg above the ulcer. The

Femoral vein thrombectomy with heparization

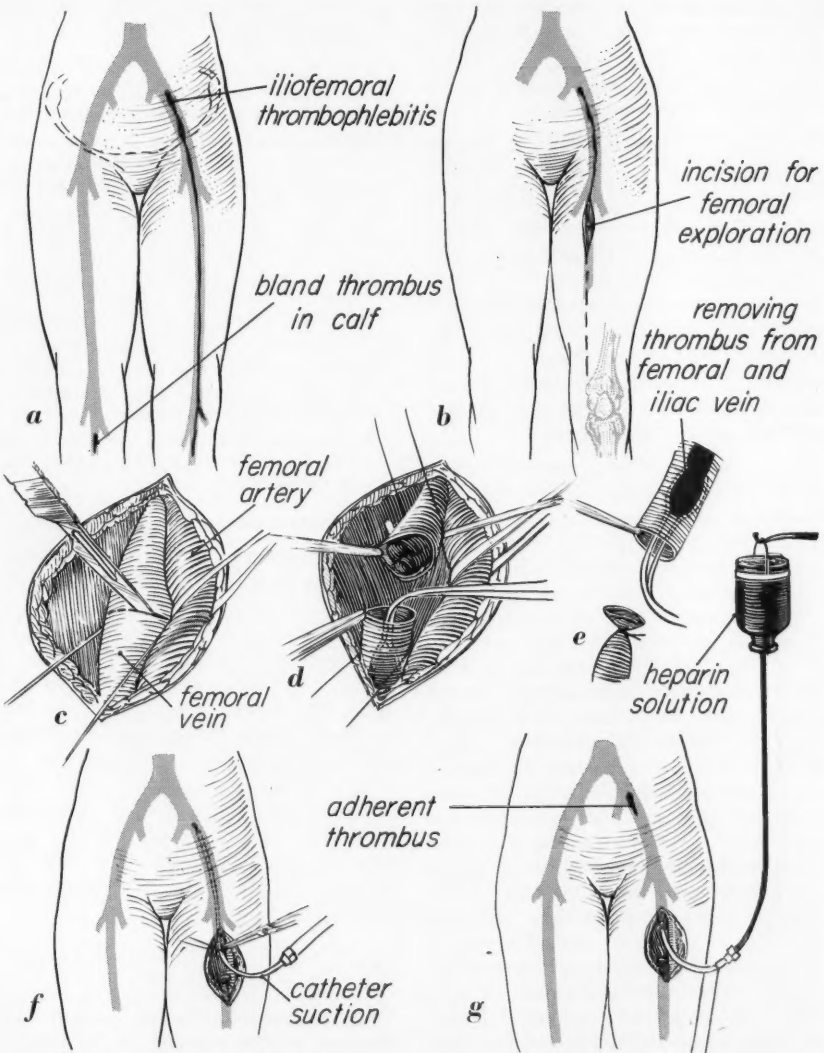

FIG. 1. Thrombectomy is performed with the table in reverse Trendelenberg position. After all clots are extracted by forceps or suction, a plastic tube is tied into the end of the divided superficial femoral vein and immediate regional heparinization instituted.

saphenous vein was ligated and stripped to the knee, and a Kondoleon's operation was performed from the knee to the ulcer. The ulcer was excised widely and the base grafted. The graft took but the cutaneous flaps formed in Kondoleon's procedure sloughed. The patient finally recovered after debridement of the skin flaps and additional skin grafting.

Conservative management is recommended for chronic indurated cellulitis in the aged, especially in the presence of small artery disease. Prolonged support of the leg by weekly application of an Unna's paste boot or an elastoplast bandage may bring about enough resolution of the process to make the patient comfortable.

PHLEBOTHROMBOSIS OF THE DEEP VEINS OF THE LOWER EXTREMITIES

The current trend is to treat uncomplicated phlebothrombosis of the calf veins with anticoagulant therapy. I agree with this form of therapy for the average case. Treatment is started with heparin and maintained with dicumarol. Since the prothrombin level of a geriatric patient may be abnormally low because of liver disease, the beginning dose of dicumarol probably should not be over 200 mg. For the aged patient, we frequently resort to surgery in the form of a superficial femoral vein ligation because of an increased incidence of fatal pulmonary embolism. We feel that superficial femoral vein ligation plus anticoagulant therapy provides more protection against pulmonary embolism than does either therapy alone. If pulmonary embolism has already occurred, immediate superficial femoral vein ligation is mandatory, for the chances are slight that the aged patient will survive a second pulmonic episode. A superficial femoral vein ligation is also performed for the following conditions:

- When anticoagulant therapy is contraindicated, as in hepatic insufficiency and jaundice, active tuberculosis, and the postoperative period following gastrectomy.
- Phlebothrombosis when a second stage operative procedure is planned or when it develops during a preoperative period of hospitalization for surgery, such as for a prostatectomy.
- Phlebothrombosis when a return to active ambulatory activity is contraindicated, as in a case of severe cardiac disease.
- Phlebothrombosis which develops toward the end of a hospital stay from some surgical procedure that has already required considerable time in the hospital.
- A failure of phlebothrombosis to respond to anticoagulant therapy.
- When there is a history of previous episodes of thrombosis or embolism.
- Recurrence of phlebothrombosis when the anticoagulant therapy is discontinued.
- Phlebothrombosis which develops concomitantly with acute arterial thrombosis or chronic arterial insufficiency.
- Phlebothrombosis which develops in the ambulatory patient carrying on his normal activities.

ACUTE ILIOFEMORAL THROMBOPHLEBITIS

Our management of acute femoro-iliac thrombophlebitis in the aged is conservative. Pulmonary embolism is an infrequent complication of this disease and the postthrombophlebitic syndrome is rarely of serious consequence in the aged. We elevate the foot of the bed 12 inches, apply voluminous warm compresses from ankle to groin, initiate active anticoagulant therapy, and perform repeated paravertebral novocaine blocks of the lumbar sympathetic ganglia. If pulmonary embolism has occurred, we resort to surgery as discussed below.

ACUTE ILIOFEMORAL THROMBOPHLEBITIS AND PULMONARY EMBOLISM

We prefer to give the aged patient who has survived an episode of pulmonary embolism the added protection of combined anticoagulant therapy and surgery. The procedure consists of exposing the superficial femoral vein in the groin (figure I, a to c), of removing the thrombus with forceps (figure I, d and

e) or suction (figure I f) and of interrupting and ligating the superficial femoral vein just peripheral to the femoral profunda. Our experience with superficial femoral vein thrombectomy has been entirely satisfactory. We have not had to resort to vena caval ligation in the aged patient. Many of our patients were seriously ill before an embolic episode occurred and were not reasonable risks for major surgery. We have incorporated regional heparinization as an additional safety factor in the vein thrombectomy technic. A plastic tube is tied in the end of the superficial femoral vein and immediate local heparinization instituted (figure I g). It is our feeling that any clot that cannot be extracted with suction or forceps while the head of the bed is raised is so adherent that it will not become detached to form an embolus. Postoperatively we rely on dicumarol and regional heparinization to prevent development of additional thrombi until healing has taken place. Continuous infusions, consisting of 500 cc. of 5 per cent glucose in water containing 100 mg. of heparin, are maintained through the polyethylene tube in the superficial femoral vein. We try to infuse one liter in twenty-four hours but regulate the rate of flow so as to keep the coagulation time at about three times normal. The plastic catheter is removed in seventy-two hours, by which time the patient is under the full effect of dicumarol. We recently reported the successful use of this method in 15 cases.

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INVOLVEMENT OF THE NECK is particularly common and troublesome among elderly arthritic patients. Treatment depends on severity, which may be divided into three stages of progressive degeneration.

Stage 1. Symptoms of sprain develop, and radiography shows some vertebral proliferation. Pain, stiffness, and spasm are relieved by a removable padded collar, which supports the neck until discomfort is gone. Heat is applied several times daily, and posture is improved by a firm bed.

Stage 2. Neurologic symptoms of varied patterns result from encroachment of bony outgrowths. In addition to support and heat, traction is provided, with the patient in bed. More severe cases may require surgery to remove pressure on the nerves.

Stage 3. Vertebral deformity is severe, with extreme proliferation of bone and narrowing or destruction of disks. Treatment must be symptomatic. In most cases, pain and disability are alleviated by a fitted supportive collar and medical supervision, both to be continued through the remaining years.

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By-pass procedure in treatment of arteriosclerotic occlusion of iliac and femoral arteries

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Arteriosclerotic occlusion of iliac and femoral arteries is segmental in nature in more than one half of patients with absent femoral or popliteal pulses. This pathologic feature permits direct surgical attack on the affected vessel.

The safest and most effective method for restoring blood flow to the extremity is the by-pass procedure, which consists of implanting an arterial homograft into the diseased vessel above and below the site of occlusion. Of 73 extremities in which the by-pass operation was used, symptoms were relieved and pedal pulses were restored in 92 per cent.

◆ Atherosclerotic thrombotic occlusion of peripheral arteries constitutes one of the most common and disabling complications of arteriosclerosis. Occurring most frequently in men in the sixth, seventh, and eighth decades, this disease produces severe restriction of activity and, if untreated, may result in loss of limb.

The occlusive process is a result of atheroma formation with superimposed thrombosis. Generally, encroachment upon and, finally, obliteration of the arterial lumen occurs slowly so that sufficient collateral circulation develops to maintain viability of the limb. However, blood flow through these secondary channels cannot approximate normal flow because of the increased peripheral resistance. Thus basal requirements of the tissues may be provided but increased demands resulting from activity cannot be met and symptoms appear. The earliest and most common complaint is intermittent claudication, manifest primarily in the muscles of the calf, in the case of femoral artery occlusion, and in thighs and buttocks if the occlusive process involves the iliac arteries. With progression of the atherosclerotic thrombotic process, collateral flow is encroached upon and pain now appears at rest. Trophic changes occur, such as osteoporosis and loss of hair and subcutaneous fat, and the skin appears waxy and cadaveric. In this advanced stage, ischemic ulceration and gangrene commonly appear to endanger the extremity.

Until recently, treatment was directed toward increasing the collateral circulation of the limb. Although a variety of measures have been employed, lumbar sympathectomy has been most widely used. Following this procedure, symptoms are temporarily ameliorated in

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about 60 per cent of cases and the threat of impending gangrene may be reduced.[3] Sympathectomy is limited in effectiveness, however, by the fact that the increased blood flow must be routed through existing collateral channels, primarily in the skin, through which normal volume flow is impossible.

It was assumed that arteriosclerosis obliterans involved the peripheral arteries diffusely, thus precluding direct surgical attack on the affected vessel, until the more widespread use of arteriography showed this concept to be erroneous and that, in more than one half of patients with absent femoral or popliteal pulses, the occlusive process is segmental.[2] This pathologic feature prompted dos Santos[4] to employ thromboendarterectomy in the treatment of the condition. This procedure consists of opening the vessel wall, removing the atheromatous and thrombotic material together with attached intima and part of the media, then repairing the wall. Although this procedure has been widely employed, the incidence of early and late failures is high.[1, 5, 7, 9]

Another form of direct surgical attack upon the diseased segment of peripheral artery consists in resection of the occluded portion and replacement with an arterial homograft or autogenous vein graft.[5-7, 10, 11] This procedure has given better results than thromboendarterectomy, but has the disadvantages of requiring long incisions in the soft tissues of the thigh and of frequently producing serious interference with functioning collaterals. Thus, in the event of failure of the vascular graft, blood flow to the distal parts of the extremity may be critically reduced.

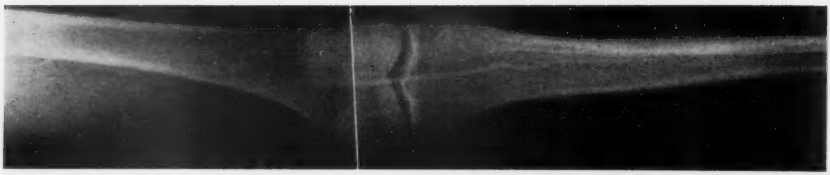
Because of these adverse features, a third surgical procedure has been advocated recently which appears to offer the maximum increase in volume flow with little danger of interference with functioning collaterals.[2] In principle, it consists in the creation surgically of a collateral channel to bridge the occluded arterial segment. This, in effect, re-establishes continuity of the vessel since the diameter of this new collateral is as great as the diameter of the host artery. Thus near normal blood flow is restored.

The technic of the by-pass procedure for occlusion of the femoral artery is essentially as follows: Under light general or spinal anesthesia, a short incision, 5.0 to 7.5 cm., is made over the femoral artery just proximal to the site of occlusion. The artery is mobilized and an area on the anterior wall selected for the anastomosis. Then a similar incision is made over the artery below the occlusion and an anastomotic site selected. The two wounds are then joined by a tunnel made either in Hunter's canal or in the subcutaneous tissue. An arterial homograft or some other vascular substitute is anastomosed end-to-side to the artery above, passed through the tunnel and sutured to the artery below the blocked segment in a similar fashion. The operative trauma and blood loss associated with this procedure are minimal, permitting its application to patients who might be considered poor risks for other types of major operations.

Any patient with symptoms of arterial insufficiency of the lower extremities and absent femoral or popliteal pulses is a potential candidate for this procedure. Actual selection of patients is made on the basis of arteriographic findings. If patency of the popliteal artery below the occluded segment can be established roentgenographically, the by-pass procedure is indicated. On the other hand, if the contrast medium does not outline the vessel below the site of occlusion, the lumen is obliterated altogether, or too small to permit satisfactory anastomosis.

Case Histories

The following case histories illustrate the circumstances under which the femoral by-pass procedure can be employed.



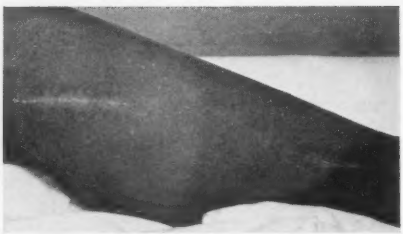


FIG. I *(above). Case 1. Composite arteriogram of left lower extremity showing occlusion of the superficial femoral artery and patency of the popliteal artery and its principal branches. Collaterals bridging the occluded segment are faintly visible.*

FIG. II *(left). Case 1. Photograph of right lower extremity two weeks after operation showing healed incisions in the groin and just above the knee through which by-pass procedure was performed. The arterial homograft lies in a subcutaneous tunnel connecting these two wounds.*

Case 1. A 37-year-old Negro man was admitted to the hospital on February 20, 1955, for treatment of an acute myocardial infarction. The patient had suffered from intermittent claudication in both lower extremities since 1949 and at the time of admission was able to walk only about 50 feet without pain. Because of this limited exercise tolerance, he was completely disabled. Examination of the lower extremities revealed normal femoral pulses at the groin but an absence of popliteal and pedal pulses bilaterally.

In April 1955, the patient had recovered from the myocardial infarction sufficiently to permit investigation of the peripheral arterial occlusive process. Oscillometric studies revealed a severe reduction in pulsatile blood flow to the lower extremities (table 1). A treadmill test, with the machine set at 120 feet per minute, produced weakness in the legs at 1.5 minutes, numbness of the feet at 7.5 minutes, and severe claudication at 8 minutes. Femoral arteriograms revealed segmental blocks of both femoral arteries in Hunter's canal, with sizable patent segments below the occlusion (figure I).

TABLE 1

OSCILLOMETRIC INDICES BEFORE AND AFTER THE BY-PASS PROCEDURE

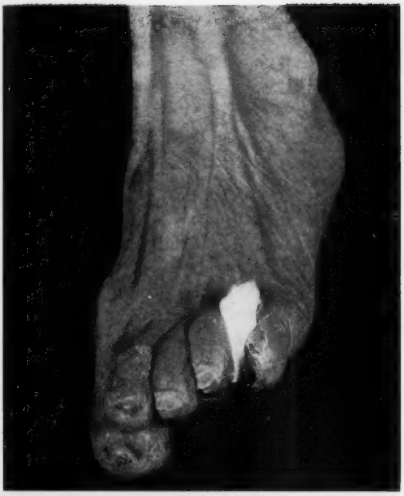
	Oscillometric index	
Region	*Preoperative*	*Postoperative*
Case 1		
Thigh	1.5	12.0
Calf	0.5	5.0
Ankle	0	1.5
Case 2		
Thigh	1.0	11.0
Calf	0	3.5
Ankle	0	1.5

On May 4, 1955, operation was performed under spinal anesthesia. Incisions were made in the groin and at the knee in both lower extremities, as shown in figure II. Arterial homografts were used to by-pass the occluded segment of each femoral artery. Upon completion, pedal pulses were present bilaterally.

The postoperative course was uneventful and on June 10, 1955, oscillometric studies indicated normal blood flow in both lower extremities as shown in table 1. The treadmill test was also repeated at a rate of 120 feet per minute for ten minutes and no symptoms were produced.

Comment: This young man was completely incapacitated by severe claudication in the legs. Although he was convalescing from a recent myocardial infarction, the femoral by-pass procedure was easily accomplished with little risk to the patient, and resulted in restoration of normal blood flow as evidenced by complete relief of symptoms.

Case 2. A 65-year-old white man was admitted to the hospital on April 21, 1955, with gangrene of the left fifth toe, as shown in figure III. About six months prior to admission he had developed cramping pains in the calf muscles



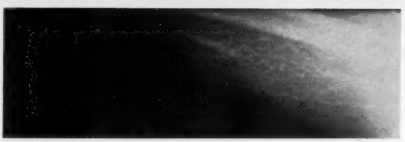


FIG. III *(above). Case 2. Gangrene of the fifth toe, before operation.*

FIG. IV. *Femoral arteriogram showing segmental occlusion of the superficial femoral artery and extensive collateral vessels bridging the occluded segment. Although a patent vessel above the obstruction is not visualized, a palpable femoral pulse at the groin was sufficient indication of its presence. Note the widely patent segment below the obstruction.*

of the left leg on walking and during the past two months the left fifth toe had become swollen and red. Several days prior to admission the fifth toe had become extremely painful and discolored, and walking was almost impossible.

Physical examination revealed noticeable pulmonary emphysema. The left foot was cold, red, and swollen and there was a black, necrotic area on the medial surface of the left fifth toe. The left femoral pulse was palpable at the groin but popliteal and pedal pulses were absent on this side. All pulses were normal in the right lower extremity. Oscillometric studies revealed an oscillometric index of 1 in the left mid-thigh region and of 0 below the knee and at the ankle (table 1). On the right, these studies were within normal limits. A femoral arteriogram disclosed segmental occlusion of the superficial femoral artery with patent popliteal and anterior and posterior tibial vessels below, as shown in figure IV.

On May 10, 1955, a femoral by-pass operation was performed, using a lyophilized arterial homograft. The upper end of the graft was implanted into the common femoral artery just proximal to the profunda branch and the lower end into the popliteal artery about 5 cm. above its bifurcation, as shown in figure V.

Upon completion of the procedure, pulsations in the dorsalis pedis and posterior tibial vessels were normal. During the postoperative period the swelling and redness disappeared from the left foot and the area of gangrenous change became dry and sloughed away, leaving normal epithelium beneath, as shown in figure VI. The patient was completely relieved of rest pain and was able to walk without difficulty. One month after operation the oscillometric index at all three levels was normal, and the treadmill test, with machine at 120 feet per minute, produced no symptoms during ten minutes.

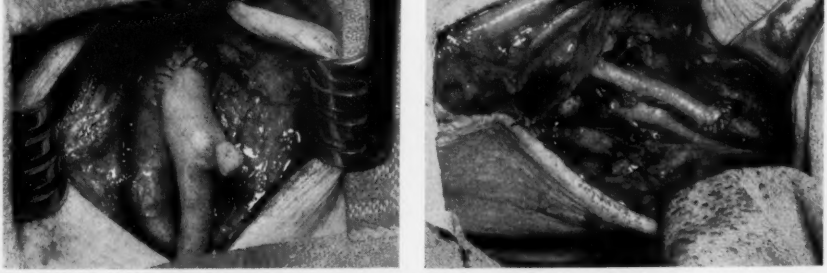


FIG. V. *Case 2. Photographs at operation showing proximal (left) and distal (right) end-to-side anastomoses of arterial homograft to femoral artery.*

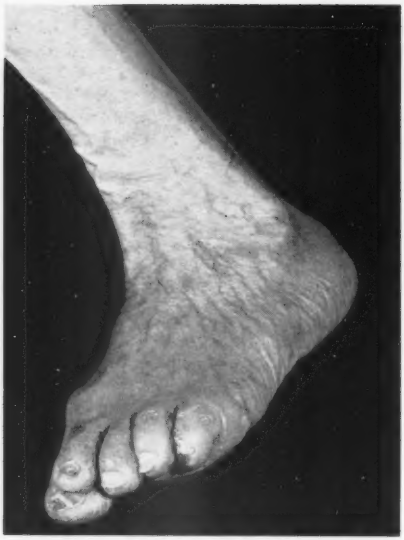


FIG. VI. *Case 2. Left foot about three weeks after operation. The gangrenous tissue has sloughed away leaving healthy granulation tissue which epithelized rapidly.*

Comment: In this case the left lower extremity was in jeopardy from early gangrene of the left fifth toe. In addition, there was severe ischemic pain in the foot which prevented ambulation. As a result of the femoral by-pass operation, pulses were restored to the foot, symptoms were relieved, and healing of the gangrenous lesion on the foot occurred.

Discussion

As demonstrated by these case reports, the results of the by-pass procedure are imminently satisfactory. In most instances, pedal pulses are re-established, indicating restoration of pulsatile blood flow through primary channels. More important, symptoms disappear or are greatly relieved, and ischemic ulcerations and pregangrenous areas frequently heal.

Because of the technics employed, collaterals remain undisturbed and existing blood flow is not altered should the graft fail. This important feature of the procedure permits its application to those with severe arteriosclerosis and a questionably adequate lumen below the obstruction.

Of 73 extremities with segmental occlusion of the iliac or femoral artery in which the by-pass procedure was used, there was no mortality and negligible morbidity. Symptoms were relieved and a pulsatile flow restored in 92 per cent, as shown in table 2.

The safety and ease with which it can be successfully applied to elderly patients with other manifestations of degenerative diseases make this the operation of choice in the treatment of segmental arteriosclerotic occlusion of the iliac and femoral arteries.

TABLE 2

RESULTS OF THE BY-PASS PROCEDURE IN 73 CASES

Vessel	*Number of patients*	*Successful results*
Iliac	45	41
Femoral	28	26
Total	73	67

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Management of lower extremities with chronic arterial insufficiency

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Nonoperative therapeutic measures are of great value in preventing many complications of chronic arterial insufficiency. The newer methods of direct vessel surgery are tentatively evaluated. Sympathectomy is indicated for many cases that are unsuitable for direct vessel surgery. As the answers to the problems regarding treatment methods are found, the various criteria for electing one type of surgery over another will undoubtedly change.

◆ It is sometimes difficult to evaluate properly the successful newer surgical methods in the management of patients with chronic arterial insufficiency of the lower extremities. In reading of the remarkable results obtained by each of the direct surgical attacks on the occluded artery, the impression may be gained that it can be applied to most patients with occlusive disease of the peripheral arteries. However, few of the individual authors intend to convey this impression. The purpose of this report is to attempt to place in proper perspective the various means of treatment now available in the management of patients with inadequate arterial blood supply to their lower extremities.

With the greater percentage of older people in our population, there is an increasing number of individuals with inadequate peripheral arterial circulation. Some deficiency of the arterial blood supply to the lower extremities probably exists in most old people. A deficiency severe enough to produce some signs or symptoms is commonly seen in those over 60. Many with a moderate degree of arterial insufficiency are unaware of its existence, although they may have noticed that their legs tire more easily or that their feet feel colder or that small abrasions on the feet or legs take longer to heal. Others with mild arterial insufficiency may be totally asymptomatic, since the aging processes elsewhere in the body have decreased their physical activity to less than that required to bring on symptoms. Often the existence of arterial insufficiency is unsuspected until suggested by abnormal response to a usually trivial episode. For instance, a small scratch on the shin may persist for months without healing, becoming a chronic ulcer; an ingrowing toenail may cause a paronychia which may initiate gangrene in the affected toe; or, gangrene itself may be the first evidence of a poor blood supply.

Whenever the absence of an adequate arterial circulation to the extremity is suggested by symptoms or signs, a careful examination is likely to confirm this by the absence of pulsations in the foot, coldness of the foot and toes, atrophy of the skin, and abnormal color changes in the toes when the extremity is raised

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or lowered. The diagnosis of arterial insufficiency can be made, in most instances, without having access to skin temperature devices, oscillometers, or plethysmographs. Although calcification along the course of the major vessels can be demonstrated frequently in roentgenograms of the legs, its absence does not rule out arteriosclerosis.

Pathology

In the older age group, the usual cause of arterial insufficiency is arteriosclerosis. While this disease is more common in diabetic than in nondiabetic patients, the pathology is similar in the two groups. Occasionally, the history will indicate that the patient probably has had Buerger's disease earlier in life, but even in these patients the microscopic features of the arterial walls are often strikingly similar to the arteriosclerotic changes seen in individuals without such a history.

Not infrequently, the most advanced portion of generalized vascular disease is segmental in distribution. The superficial femoral artery may be completely occluded in the adductor canal for a distance of 2 or 3 inches with the adjacent portions of the vessel remaining relatively normal. In the majority, however, there is advanced disease in more than the one isolated segment, usually involving most of the peripheral arterial tree, including the popliteal and tibial arteries. Often the occlusive disease has effectively blocked the main arteries to such an extent that blood is able to reach the distal parts of the extremity only by way of collateral vessels.

In considering the various means of attempting to improve the flow of blood to the distal portions of such extremities, it is essential to have a clear concept of the actual pathology to be expected in the several portions of the peripheral arteries. If only a small segment is occluded and the adjoining portions of the vessel are relatively normal, the short segment may be by-passed, treated by thromboendarterectomy, or excised with subsequent grafting. On the other hand, if there is diffuse, advanced disease throughout the peripheral arterial tree, something other than a direct attack on the main vessels should be considered. In most instances, arteriography is required in order to determine the extent of the occlusive disease.[1]

Nonoperative Therapeutic Measures

In determining the therapy for any individual patient, it is necessary to know the various forms of treatment which can be used and to be aware of their limitations as well as what they can be expected to accomplish.

Nonspecific, nonoperative, local, and general measures are, in many instances, invaluable and may suffice to avert an acute episode which would threaten the patient's limb and life. These conservative measures are well known but may be lost sight of occasionally in enthusiasm for one of the newer and more dramatic operative procedures.

The hematocrit should be normal or near normal in order to allow maximum benefit from the amount of blood which is reaching the tissues. Without altering the blood flow, the nutritional status of an extremity may be changed from poor or borderline to good by restoring the hematocrit to normal, by appropriate transfusions, by use of dietary supplements, or by correcting some cause of chronic blood loss. For the obese, a reduction in weight may allow better utilization of the amount of blood which is reaching the extremity. An increase of blood flow through an extremity will result from the successful medical management of a patient in chronic cardiac failure.

Since tissue anoxia is a stimulus to the development of collaterals, ambulation within the limits of tolerance should be encouraged. Smoking is discouraged since it is known to affect the tone of

the arterial tree, both in normal patients and in those with thromboangiitis obliterans, and is assumed to be detrimental to those with arteriosclerosis. When the arteriosclerotic patient is unusually dependent upon smoking, we do not always insist that smoking be stopped. Buerger's exercises have not been used consistently and, possibly because of this laxity, we have not been impressed with their efficacy. If used almost continuously, they would probably result in some increase in the flow of blood to the lower extremities.

Of paramount importance to all individuals with arterial insufficiency is the institution of good local foot care. Proper trimming of the nails, cleansing of the feet at least once a day, frequent change of socks, and wearing of well-fitted but loose, broad-toed shoes cannot be overemphasized. Small foci of infection between the toes should be guarded against, by use of the measures discussed plus specific antifungus medication. Our experience at the Salt Lake County General Hospital indicates how helpful these local measures can be. Since the addition of a chiropodist to the Peripheral Vascular and Diabetic Clinics, with the subsequent better foot care to the clinic patients, the number of major amputations for gangrene has been reduced more than 50 per cent. Most of this improvement can probably be ascribed to better care of the feet.

Vasodilator drugs have received considerable emphasis in the past few years in the treatment of peripheral vascular diseases. No great benefit should be expected from these general vasodilators in patients whose chief difficulty is arterial insufficiency of the lower extremities, since their greatest effect is in the areas of less diseased vessels. Instead, the amount of arterial blood reaching the lower extremities may actually be decreased. In a patient with mild symptoms, a trial period of Priscoline, Hydergine, or Roniacol leads occasionally to symptomatic improvement, perhaps the result of the drug plus the beneficial effect of gravity in the ambulatory patient. Alcohol by mouth is a form of therapy that is popular with most patients since it is pleasant to take. Physicians like to prescribe it because they feel that at least this part of their advice will be followed. However, in the therapy for peripheral vascular disease, alcohol should not be overemphasized to the extent of producing chronic alcoholism.

Some physicians have found intra-arterial histamine effective in promoting the development of collaterals, but our limited experience has not demonstrated its usefulness. To my knowledge, the prolonged use of heparin or dicumarol to prevent further occlusions of the main arteries of the extremities has not been evaluated adequately.

Operative Measures

The applicable operative procedures can be considered in two general categories —(1) those with direct vascular approach and (2) those with approach through the sympathetic nervous system. The direct vascular approach consists of re-establishing patent conduits from above a point of obstruction to below the main obstruction by any one of a number of methods. The second approach is based largely on the possible beneficial effects of sympathectomy on the development of collateral pathways. Only in the past few years has the direct vascular approach been proved feasible for an appreciable number of individuals with chronic arterial insufficiency. Such tremendous strides have been taken in this direction that there is danger of subjecting some patients to direct vessel surgery who might benefit more from sympathectomy. Some form of direct vessel surgery is probably best for those patients who have one short, or relatively long, segment nearly or completely

occluded, but who otherwise have only moderately diseased arteries. Those with Leriche's syndrome,[2] a complete chronic occlusion of the terminal aorta usually involving both iliac arteries to a varying degree, are best treated by this approach, unless there is also noticeable disease of the main vessels distally. Those with complete or nearly complete occlusion of the superficial femoral artery, even if the occlusion extends down into the popliteal artery, are probably best treated by the direct vascular approach, if there are good popliteal and tibial arteries distally through which a good flow of blood can be re-established. Short occluded segments of the iliac vessels, in many cases a forerunner of what would later become Leriche's syndrome, can be similarly treated.

MEANS OF RE-ESTABLISHING MAIN ARTERIAL CHANNELS

Three methods by which a good flow of blood can be re-established to the area beyond an occluded segment of main artery are: (1) thromboendarterectomy; (2) excision and replacement by graft or prosthesis; and (3) by-passing by graft or prosthesis.

1. Thromboendarterectomy

This procedure consists of dissecting out the organized thrombus with the attached intima and adjacent vessel wall, leaving a relatively smooth surface to the new lumen. This is accomplished through incisions at each end of the occluded segment, sometimes opening the vessel throughout the length of the occlusion. The intima must be sutured to the vessel wall at the point where dissection is stopped, both distally and proximally. This is not a difficult procedure, but unless there is a good vessel distally through which blood can flow freely, recurrence of occlusion in the reamed-out segment is common. How well the remaining vessel wall withstands arterial pulse and pressure over the years has not been adequately demonstrated. Occasionally, most of the elastic fibers are removed during thromboendarterectomy, and it would not be surprising if the remaining part of the wall proved inadequate to prevent aneurysmal dilatation. The danger of subsequent dilatation is much greater in the intra-abdominal portion of the large arteries than in the extremities where there is more support from the surrounding structures and less effective dilating force. The Mayo extraluminal vein stripper has been used effectively in reaming out long segments of occluded superficial femoral and popliteal arteries, but the incidence of reocclusion in our patients has been high. Cannon and Barker report excellent results from a similar but more refined technic, with a low incidence of subsequent reocclusion.[3] Heparin should be started during the operation and continued for a few days postoperatively.

Figure I demonstrates a technic of thromboendarterectomy.

2. Excision and Replacement by Graft or Prosthesis

In this method the occluded segment of artery is excised up to and down to relatively good artery and the blood flow is re-established by anastomosis with a suitable length of vessel graft or plastic prosthesis. This method is usually less difficult technically than that of thromboendarterectomy and is less prone to early thrombosis. The disadvantages of the various forms of grafts and plastic prostheses will be considered later.

Figure II illustrates the insertion of an alcohol-stored homograft after excision of an occluded segment of artery. Figure III illustrates the vessel formed after the similar use of a vinyon N prosthesis.

3. By-passing by Graft or Prosthesis

In the process of excising an occluded segment of artery with enough margin

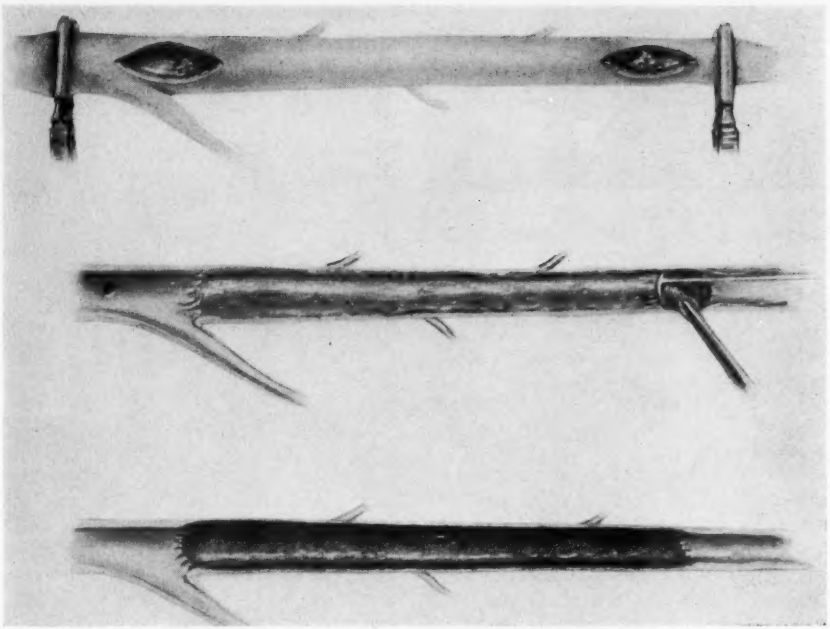

FIG. 1. *Technic of thromboendarterectomy. The upper drawing illustrates the two small incisions through which the procedure is performed. The middle and lower drawings are longitudinal sections of the artery. The middle figure shows a wire loop being used to separate the thrombus with attached intima and adjacent tissue from the remaining portion of the vessel. The lower drawing illustrates a method of attaching the intima at the limits of the dissection to the vessel wall.*

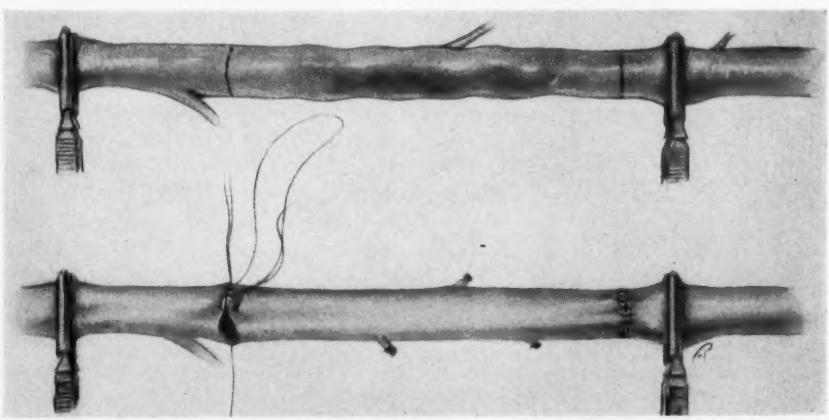

FIG. 11. *After excising the segment shown by the dotted lines in the upper drawing, an alcohol-preserved homograft is inserted in place with a continuous over-and-over stitch, using arterial silk, size 5-0 or 6-0, with a swedged-on atraumatic needle.*

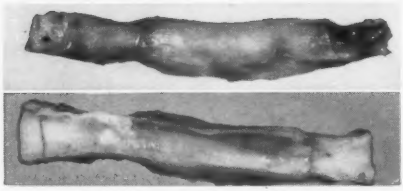

FIG. III. *(Above) This vinyon N prosthesis had been functioning for fourteen months at the time of sacrifice. The vinyon is seen to be incorporated within fibrous tissue. (Below) The prosthesis and adjacent aorta have been opened, revealing a smooth, glistening intima lining the prosthesis.*

on each end to reach an arterial wall suitable for anastomosis, it is not uncommon to have to sacrifice one or more rather important collateral vessels. Occasionally, if the graft or prosthesis later becomes occluded by thrombosis, the patient has less blood supply to the extremity than he had originally. To obviate this hazard and to simplify the operative procedure, the occluded segment may be left undisturbed by establishing a shunt from above the occluded segment to below it by means of a suitable graft or prosthesis. Without extensive dissection, the upper end of the graft or prosthesis is joined to the host's vessel above the point of obstruction by an end-to-side anastomosis, and the lower end is joined similarly to the host's vessel below the obstruction, as shown in figure IV. Linton and Menendez[4] and Crawford and DeBakey[5] report very promising results from this procedure.

CHOICE OF GRAFTS OR PROSTHESIS

Autologous vein grafts are satisfactory as substitutes for arteries within the extremity, but a suitable vein is not always available in the patient. Even if a vein is available, its dissection prolongs the procedure. The autologous vein graft, which fits well at both ends, is probably less prone to early thrombosis than an arterial homograft. Except in the case of short segments, it is difficult, and frequently impossible, to secure a good fit using autologous veins, since the graft must be turned around so that its valves do not impede the flow of blood. There also may be more chance of late thrombosis with vein grafts than with arterial homografts.

Arterial homografts serve effectively for some years, although they are ultimately replaced completely by the host's own tissues and the elastic fibers eventually disintegrate. The rather burdensome method of preservation by the freeze-dried technic has been a deterrent to their common use. However, both our experience and that of others with alcohol-stored grafts has been good, indicating that the more troublesome technics required with freeze-dried methods may not be necessary. The grafts may be taken without strict asepsis and placed directly into a solution of 70 per cent alcohol, where they may be stored for periods up to at least six months. Rinsing of the grafts in normal saline for thirty to forty-five minutes restores, in large measure, their previous elasticity and

FIG. IV. *A short end-to-end shunt is shown. Much longer occluded segments can be successfully by-passed with this technic.*

makes them quite suitable for use. This method of storage does not kill spores which may be present in the graft, but neither does the freeze-dried method unless supplemented by the use of a sterilizing agent. In spite of several positive cultures from such grafts at the time of implantation in human beings and in dogs, we have observed no clinical difficulty attributable to this factor. The possibility that alcohol-stored homografts have less antigenicity than grafts stored by other methods is being investigated in our laboratory. If the antigenic properties of heterografts can be destroyed in this manner, heterografts might be safely used. If by this or some other method, heterografts could be so altered that they serve as well as homografts, then the present difficulty of maintaining an adequate supply of grafts would be largely overcome.

As we have said, homografts are eventually completely replaced by the host's own tissue and, although they have served well as aortic replacements for as long as six to eight years, it is to be expected that, at some time in the future, aneurysmal dilatation will occur which may require removal.[6] When used as replacements for the smaller arteries, including the femoral, a discouragingly high late thrombosis rate has been noted.[7]

Plastic fabrics have been used as substitutes for the large vessels[8] because of the uncertainty of the long-term results of homografts and because of the difficulties in securing and storing adequate supplies of homografts. Technically, the various forms of plastics have worked well. They are relatively easy to make into desired shapes and sizes. A large assortment of shapes and sizes can be kept indefinitely and are always available. Or, they can be tailored to fit at the time of surgery, as demonstrated by Poth.[9] However, the ultimate fate of the various plastic substances when embedded within the body is uncertain. We have shown that some of them lose strength rapidly when embedded in the tissues of the dog. Poth has substantiated this in regard to nylon. Our unpublished results indicate that nylon, orlon, and fortisan, as well as the natural fibers, silk and cotton, lose strength rapidly and because of this are unsuitable for use as substitutes for vessels. To date, vinyon N and dacron have shown little, if any, loss of strength. Polyvinyl sponge (Ivalon sponge), polyethylene, fluorethene, and Teflone are being studied similarly, but the results are not yet known.

It seems reasonable to assume that, without the added support of elastic fibers or the plastic fibers of the prosthesis, fibrous tissue structures will be unable to withstand indefinitely the arterial pressure and pulsations to which arterial walls are continually subjected.

At the present time, it is impossible to draw conclusions concerning the superiority of one method of direct vessel surgery over another. The decision to bypass an area with a shunt, to resect the occluded area, or to perform a thromboendarterectomy instead, d e p e n d s chiefly upon the experiences and preferences of the surgeon concerned. Each method has its advocates and each has some disadvantages. Likewise, the most satisfactory method of preserving arterial homografts is yet to be determined. Whether certain of the plastic prostheses will prove superior to homografts can be decided only after longer clinical trials and more experimental observations, but it is probable that nylon and orlon should no longer be used.

PROMOTION OF DEVELOPMENT OF COLLATERAL VESSELS

The development of collateral arteries is stimulated by anoxia of tissue and by the differential in pressure above and below an arterial occlusion. At present, sympathectomy is the only practical operative procedure which offers improvement of the collateral blood supply to a part.

Sympathectomy, by releasing the smaller arteries and arterioles from the vasospastic influence of the sympathetic nerve, improves the blood supply to the extremity, particularly to the skin, and, at least in some instances, to the deep tissues. It will stop sweating in the affected part and make it warmer by improving its blood supply and by preventing the cooling effect of evaporating sweat. It decreases the probability of infection in the affected extremity by helping to eliminate the common fungus infections which often serve as the avenues through which bacteria penetrate the protective covering of the skin. If pain is an important complaint, sympathectomy will commonly give amelioration, except when the pain is of the continuous "night pains" type, indicative of severe ischemia and possibly of ischemic neuritis. Contrary to some reports, we have found that intermittent claudication is frequently improved after this procedure.

Direct vessel surgery is preferred in patients with Leriche's syndrome or with segmental occlusion elsewhere, if there is a decent artery distally. In the remainder, which in our experience represents the majority, sympathectomy should be seriously considered.

We assume and believe that some improvement will follow sympathectomy in nearly all extremities hampered by inadequate arterial blood supply. This does not mean that sympathectomy is advisable routinely. Many patients have symptoms too mild to warrant the procedure or respond satisfactorily to nonoperative methods of treatment; others have strong contraindication to any surgical procedure; some have far advanced local gangrene; and some have localized arterial occlusion which may be corrected by direct vessel surgery. In those patients not falling into one of the above groups, however, we believe that sympathectomy is of benefit and should be given a trial. Until recently, a preliminary test of a paravertebral sympathetic block with procaine has been used routinely. If the response to a temporary block is good, with rise in skin temperature, improvement in exercise tolerance, or noticeable relief of pain, a sympathectomy will be of benefit. In addition, many patients without such response to a block will show much improvement after a sympathectomy, although sometimes it is not manifest in the first few weeks. Some use the test to screen out those who are likely to have a "paradoxical response," indicated by a reduction in skin temperature following the block. From personal experience and from the more extensive experience of others, my impression is that the danger of a "paradoxical response" has been overemphasized. We have observed no instance in which the cessation of sympathetic impulses produced by block or operation was thought to be responsible for a worsening of the condition of an extremity. The occasional acceleration of a gangrenous process following sympathectomy is interpreted as being caused by thrombosis of a main or important collateral artery, a phenomenon which probably occurs more often unrelated to sympathectomy than following it. Currently, the preoperative block is being omitted.

The preferred type of sympathectomy for the average older patient with diffuse arterial disease of the lower extremity is a unilateral lumbar sympathectomy, from the first through the fourth or fifth vertebrae, inclusive. However, the extent is frequently limited to the second through the fourth or fifth because of the technical difficulty in removing the first lumbar ganglion. If the femoral artery is blocked proximally, we believe that the extra effort required to include the first lumbar ganglion in the dissection is justified. If the badly diseased arteries extend up into the iliac and lower aortic areas and are not amenable to direct vessel sur-

gery, we have had success in following Grimson's suggestion[10] of extending the sympathectomy up to the eighth or ninth dorsal vertebra.

In general, a unilateral sympathectomy is preferred if the symptoms are confined to one side or if the condition of one extremity is precarious. Unless contraindicated for medical reasons, a bilateral sympathectomy is performed if the symptoms are bilateral and there is no impending gangrene.

We use sympathectomy more liberally for the diabetic than the nondiabetic patient, for the diabetic is more likely to have a sudden catastrophe in an asymptomatic extremity because of his greater susceptibility to infection. It is not unusual to have a diabetic patient, with good pulsations in the foot vessels, develop gangrene of a toe secondary to a minor abrasion or infection. The added benefit of a dry foot, which discourages epidermophytosis, is particularly valuable here. For these reasons, sympathectomy is usually bilateral for those who are diabetic, even though symptoms are unilateral, unless it is contraindicated by the patient's general condition or by a precarious condition of one extremity.

Our results from sympathectomy in those who enter with gangrene of one or two toes are considerably better in diabetic than in nondiabetic patients, in that we are more often able to prevent a major amputation.

Contraindications to Sympathectomy

Although technically simple and without much risk either in morbidity or mortality,[11] there are contraindications to sympathectomy. Some patients are such poor risks that the mere prolongation of their hospital stay is apt to provide the time necessary for development of more severe renal, cerebral, cardiac, or pulmonary pathology. Many of those over 65 or 70 years of age are in this category, leading us to believe that unless strongly indicated, sympathectomy is best omitted in most such individuals. If gangrene is already so extensive that a major amputation is necessary regardless of the possible benefits of sympathectomy, it is better to proceed directly with the amputation. In our experience, those with continuous "night pains" have not responded to sympathectomy, nor have they responded for any appreciable period to peripheral nerve crushing. A low thigh amputation without preliminary procedure is probably indicated in such instances.

In substance, then, sympathectomy is contraindicated if there is little to gain from it and if, because of advanced coexistent disease, it imposes a considerable and greater risk than will be offset by its possible benefits.

Conclusions

Conservative measures in those with early or mild disease are worthy of emphasis, are most rewarding, and are too often neglected.

The relative value of the various forms of direct vessel surgery cannot be fully assessed at this time. Each of the three main methods of direct vessel surgery has specific advantages in some situations, but the ultimate place of each must await further work and observations over longer periods.

Which, if any, of the presently used substitutes for arteries will prove most satisfactory from all standpoints is not known. Both arterial homografts and plastic prostheses give excellent early results, but there is considerable question as to how long these good results will last. A distressingly high rate of reocclusion of homografts, when used for smaller arteries, has been noted as well as fairly early degenerative changes. Certain plastic fabrics, notably nylon, deteriorate too rapidly within the body to be acceptable, while others appear much more promising from this standpoint.

An essential prerequisite for the successful application of any direct vessel surgery is the presence of a sufficiently good arterial tree distally to allow the reestablishment of a good rate of blood flow. Without this, direct vessel surgery will promptly fail. Unless the distal arterial tree is in a reasonably good state, sympathectomy, through its effect on the collateral vessels, remains the procedure of choice. It is possible that sympathectomy with its less dramatic benefits will become advisable in some of those now being treated successfully by direct vessel surgery to soften the ill effects of subsequent occlusions.

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FRACTURES in the aged should be treated conservatively. Emphasis is on preservation of life rather than correction of the deformity. Treatment, trauma, or concurrent disease may initiate gangrene. Moleskin traction, casts, pins, or intermedullary nailing may lead to necrosis. Injury to vessels can cause tissue breakdown. Spontaneous gangrene is seen in debilitated persons with hypertension, diabetes, vascular disease, or renal disorders. Symptoms in the pregangrenous phase include local pain, loss of pulse, and cadaverous discoloration. Neurovascular signs are prominent.

Treatment is largely supportive. Early ambulation and indirect heat may improve circulation. Sympathetic block and blood transfusion induce beneficial vasodilation. Pulsation determinations, oscillometry, and registration of skin temperature are done before orthopedic measures are begun. Skeletal traction is preferable to casts or moleskin. When the vascular supply is deficient, intramedullary nailing for fracture of the femur is strongly condemned.

Refrigeration may prevent intoxication and improves the condition of the patient before operation. Supracondylar amputation is done if necrotic areas do not yield to supportive or local treatment. Spinal anesthesia is preferred.

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Lumbar sympathectomy in the arteriosclerotic lower limb

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Recently reported results of lumbar sympathectomy have confirmed our impression that it is a valuable form of therapy in relieving the distress of a diminished peripheral circulation caused by arteriosclerosis obliterans. Beneficial effects are noted mostly in mild and moderate cases. Early use of this operation will eliminate the necessity of many major amputations later on and do much to improve the end results in this vascular condition. Injudicious choice of patient jeopardizes the operation's role in this therapy and the disappointing results prejudice others in its further use.

◆ Many physicians are still reluctant to recommend the use of lumbar sympathectomy in the management of arteriosclerotic vascular disease of the lower limb. This hesitancy may stem from previous experience with poor operative results, misconceptions regarding the limitations and results of this surgery, or the belief that such patients tolerate the procedure poorly and should, therefore, be managed by other therapeutic methods. Prior to 1940, it was generally held that this procedure offered little in the treatment of such obliterative vascular disease. Under the investigations of Reichert,[1] Smithwick,[2] Atlas,[3] and others interested in the problem, it was shown that interruption of the sympathetic nervous system could benefit these patients. Recently, such authors as Pratt,[4] Berry and co-workers,[5] and Atlas[6] have re-emphasized the value of this operation by reporting large series of cases or original investigation pertaining to the treatment of arteriosclerosis obliterans. The purpose of this report is to review our experiences with lumbar sympathectomy in lower limb arteriosclerotic disease and to urge consideration of this operation in more of these patients at an earlier date.

The complaints and findings in patients with arteriosclerosis obliterans, whether of the segmental or diffuse types, are the result of peripheral ischemia. The subjective symptoms of these patients will vary from "legs that tire easily and always seem cold" to potential or obvious gangrene. Vague paresthesias, intermittent claudication, and pain at rest may be obtained in the history. During physical examination, diminished to absent peripheral pulses are usually found. Postural color changes of the skin with delayed venous filling and trophic changes of the skin and nails with soft tissue atrophy may be observed, the degree depending upon the duration of the disease. Many patients, especially those having diabetes as a complicating disease, will give no classi-

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cal vascular history and will present cellulitis or early gangrenous changes of short duration when first examined. The onset in these patients may have been insidious or related to seemingly insignificant recent trauma. The presence of small chronic ulcerations which fail to heal by accepted methods of therapy should arouse suspicion of vascular insufficiency in both diabetic and nondiabetic patients.

Arteriosclerotic obstruction and associated vasospasm are the factors which cause the decrease in peripheral blood flow. The therapeutic problem centers around increasing the distal circulation. Segmental forms of the disease in the larger calibered vessels are being treated more and more by vascular grafting. Sympathectomy may be used with the graft or can be used to advantage by itself if grafting is not feasible or available. Thromboendarterectomy has been used, often in conjunction with sympathectomy in removing a localized lesion. In diffuse type of disease with involvement of the smaller vessels and their subdivisions, such direct surgical repair is not presently possible and it is in these cases that lumbar sympathectomy is of special value. The rationale to the use of this operation in the treatment of arteriosclerosis obliterans lies in the abolition of the vasoconstrictor reflex to the peripheral collateral bed and the interruption of the sympathetic reflex arc. Most authorities feel that sufficient spasm is present in this condition to justify the use of the operation. Pratt[4] ably reviews this aspect of the subject in his recent article. With the release of vascular tonus, the arteriolar bed dilates permitting the development of a better collateral circulation. It should be remembered that the luminal status of the partially obstructed larger vessels remains the same following such surgery. Thus sympathectomy, as emphasized by many others, is not the cure for peripheral arteriosclerosis since the underlying process is by-passed and not altered. With the sympathetic arc interrupted, the influence of factors such as cold on the limb is removed. Early use of sympathectomy in this disease enhances its value, for time aids in developing the collateral vascular bed to the maximal extent. Much has been written regarding the use of systemic vasodilating drugs and various forms of physical therapy in the treatment of these patients. Other than for offering temporary relief early in the course of the disease, we believe that this type of therapy has been overemphasized. In our experience, the most certain and longest lasting vasodilating therapy in the lower limb has been accomplished through lumbar sympathectomy.

Material

Sixty-five lumbar sympathectomy operations were performed in our hospital from 1949 until mid-1955 as adjunct therapy in the management of arteriosclerosis obliterans. This involved a group of 59 patients, 6 of whom underwent bilateral operations. Thirty-nine patients were men; the remaining 20 were women. The greatest number of our cases, 63.7 per cent, occurred in the sixth to eighth decades of life. The youngest patient was 43 years old and the oldest was 88. In a recently reported series by Berry and his group,[5] it is interesting to note that of 275 patients undergoing lumbar sympathectomy for arteriosclerotic vascular disease 11, or 27.2 per cent, were over 75 years of age. Pratt[4] reports that, of 309 sympathectomies for obliterative vascular disease, 30, or roughly 10 per cent, were in patients over 80. Twenty-one of our 59 patients, or 35 per cent, were over 70 when their operations were performed. Thus it can be stated that, from the standpoint of age, the elderly patient need not be denied this operation if he is in good general condition and justifiable indications are present. Many sur-

geons arbitrarily set 70 years as an upper age limit of usefulness to this operation. Others feel that age is not a limiting factor but ask that the patient be a good risk from a cardiovascular standpoint. We agree with the latter group, for a few of our more gratifying results have been in elderly patients. The duration of patients' complaints was analyzed and found to vary from one to two weeks in the unusual case to seven to nine months in the usual instance. Several of the members of this group had had symptoms of chronic peripheral ischemia for periods varying up to five years. A follow-up study was obtained in every case, either from the patient or his family. The observation periods varied from four months to five years.

The management of peripheral ischemia should be handled by combining both medical and surgical talent. Medical evaluation, if not previously performed, is requested with emphasis on the cardiovascular status. We feel that such conditions as congestive heart failure, diabetes, impending uremia, and hypertension should be recognized and treated prior to surgery. Chronic low blood volume and anemia are corrected by whole blood transfusions. Bacteriologic sensitivity studies are of value when cellulitis with or without gangrene complicates the problem, since many of the bacteria have been found to be resistant to the commonly used antibiotics. We prefer loose dry dressings over such areas, feeling that soaks of all types only further macerate the already devitalized tissue. Excess heat increases the pain and symptoms of ischemia. Oscillometric studies in these patients have been discontinued since we feel it is a time-consuming task which offers little from a practical viewpoint in determining future treatment. We have placed more emphasis on palpation of the peripheral pulses and the clinical picture of the limb in its entirety. One or more lumbar sympathetic blocks are usually performed. Thermocouple skin temperature readings may or may not be taken at that time. A favorable response indicates that a good result should be obtained following excision of the lumbar sympathetic chain. A poor response has not influenced our judgment in performing this surgery in those patients for whom we feel that it is indicated. This opinion is voiced by Berry and associates[5] and by other authors regarding the lumbar block as a prognostic test. Our observations have also borne this out. In the past, we have had little experience in the direct visualization of the vascular system by radiopaque media; however, we are now using it more frequently in diagnosing and treating segmental form of disease.

Incidence of Trauma and Diabetes

Trauma is still an important factor in initiating the cycle of events leading to gangrene in the arteriosclerotic limb. In 25 of our patients, or 42.3 per cent, a history of indirect or direct injury was obtained. This varied from the use of strong liniments, "drawing salves," and hot soaks to the irritation produced by ill-fitting footwear. Injudicious nail, corn, and callus surgery, both on a lay and professional level, accounted for several such cases. It must be emphasized again that more than the usual care and consideration be given to these ischemic feet.

Of our 59 cases of arteriosclerosis obliterans, 30, or 50 per cent, had diabetes as a complicating disease. This percentage is higher than in most other series and reflects the consultation requests from the Medical Service for aid in managing the complications in these people. The role of diabetes cannot be slighted in patients with diminished circulation. The amputation rate is higher in these people and the total life expectancy is somewhat shortened. This has been noted in our series as well as in others.

Surgical Technic and Aftercare

The operation is performed through an anterolateral muscle-splitting incision. The peritoneum and retroperitoneal fat with its contents are swept forward and medially. The lumbar sympathetic chain is identified and all ganglia and ramifications from the sacral prominence up to and including the second lumbar ganglion are excised and sent to the laboratory for confirmation by the pathologist. The wound is closed in layers by interrupted sutures. Various opinions are noted in the literature concerning the level of extirpation of the sympathetic ganglia, and much has been written regarding the respective virtues of "high" and "low" type procedures in the treatment of such disease. We have followed the tenets of Atlas,[6] Detakats,[7] Debakey and his group,[8] in using the "low" operation.

Our patients have required but minimal supportive treatment during or after surgery. We attempt to mobilize them on the first postoperative day. Abdominal binders may be used for support in obese patients. Some physicians, advocating the nonsurgical treatment of this disease, have intimated that this surgical procedure is associated with considerable morbidity. This has not been our experience nor the experience in the larger series. By using this regime, the postoperative hospital stay has averaged eight to nine days and the morbidity and mortality have been minimal. We have been gratified with the postoperative course in this group of patients. Prior to hospital discharge, the patients are instructed in the proper care of their legs, including avoidance of constricting clothing, extremes in temperature exposure, ill-fitting footwear, and injury. The anhidrotic effect noted after surgery aids in the basic hygiene of the feet. Strict adherence to the diabetic regime is recommended if this complicates the picture.

Mortality and Complications

Two hospital deaths occurred in our series of 65 lumbar sympathectomies, or 3.0 per cent. Pratt[4] reported 9 deaths, or 3 per cent, in his large series while Berry and associates[5] reported 8 deaths, or 3.4 per cent, in their series. One fatality was that of an 84-year-old man who died on the eleventh postoperative day from a probable coronary artery thrombosis. He had been treated at our institution seven years previously for a proved myocardial infarction. Our second death occurred in an 80-year-old man who, two weeks before, had had a successful left lumbar sympathectomy for moderate disease with gangrene of a toe. A right-sided procedure was recommended and was carried out uneventfully two weeks after the first operation. The patient had a cerebrovascular accident the following day and expired one week later. Many physicians will question the advisability of performing such surgery on patients in the eighth and ninth decades of life; however, if we feel they stand to benefit from the surgery we have not hesitated to recommend it. One major complication was noted in the remainder of the group, or an incidence of 1.5 per cent. Massive progressive gangrene of the left leg developed in 1 patient postoperatively. It was felt that an atheromatous plaque had become loosened from the severely involved wall of the lower aorta or common iliac artery during retraction and obstructed one of the larger distal arteries. A high amputation was later necessary. Minor complications were infrequent.

Classification and Evaluation

In analyzing our cases treated by sympathectomy we used a classification based on chief complaints and physical findings. Four main groups were formed.

Group I. The 10 patients in this group complained only of numbness, coldness,

or intermittent claudication. Diminished to absent peripheral pulsations were noted in all of the limbs. Four of these patients also had diabetes. All 10 are living, with the shortest postoperative follow-up being four months and the longest, forty months. Twelve lumbar sympathectomies were performed, with two patients undergoing bilateral procedures. One supracondylar amputation was later necessary. This occurred in a diabetic patient fourteen months post sympathectomy. No other operations have been performed on these sympathectomized limbs. One patient has recently complained of moderate bilateral leg pain following his unilateral operation fifteen months ago. Our follow-up indicated that the remaining people were enjoying good health and were satisfied with the results of the surgical procedure.

Group II. The 8 patients in this group complained primarily of mild to moderate rest pain. Intermittent claudication, paresthesias, and objective findings such as postural color changes and mild trophic changes were also present. Two of the 4 diabetic patients in this group are dead. Eight sympathectomies were performed in this group with the shortest follow-up in those living being four months and the longest fifty-two months. No minor operations were performed in conjunction with the lumbar sympathectomy or have been necessary following that procedure. Two major operations, supracondylar in type, were performed on the patients in this group. One, the result of the previously mentioned complication, was performed one week after the initial operation. The other was performed one month post sympathectomy. One person, fifty-two months after unilateral sympathectomy, reported an exacerbation of his burning pain. Another patient is also having constant burning pain, thirty-seven months after operation. The remainder of the group are asymptomatic.

Group III. The 5 patients composing this group complained of constant rest pain. This superseded all other complaints and usually required the use of narcotics in alleviating the distress. Such conditions as atrophy of soft parts, persistent blanching, and dependent rubor were present and indicated severe disease. Three of the 5 patients had diabetes. Five sympathectomies were performed in this group. All 5 persons are dead, having succumbed to the complications associated with generalized arteriosclerosis. The shortest time a patient lived after sympathectomy was three months and the longest time, fifteen months. One minor operation was performed in conjunction with lumbar sympathectomy while 3 major operations—supracondylar amputations—were deemed necessary after sympathectomy. The shortest time lapse between lumbar sympathectomy and amputation was two months while the longest was twelve months.

Group IV. When first examined, the 36 patients in this group had tissue necrosis, consisting of obvious ulceration or gangrene of a portion of the foot. Associated complaints such as cramping, mild pain, and so on, were also present. The fact that the majority of the cases in this report, 61 per cent, were thus involved indicates an element of delay or neglect somewhere along the therapeutic course, according to Pratt.[4] Diabetes was noted in 20 of the 36 patients. An attempt was made to subdivide these patients into *mild* or *moderate disease involvement* according to the history, physical examination, related studies, and degree of tissue necrosis present. Our 2 hospital fatalities occurred in this group.

Mild involvement was thought to be present in 21 of these patients. Twenty-three operations were performed, with 2 patients having bilateral procedures. Eight of these patients are dead. Among the 13 living patients, the longest follow-up is fifty-two months. Ten minor oper-

ations were performed in conjunction with or shortly following the sympathectomy. Amputations of digits and incision with drainage formed the greater portion of the minor surgery. Only 2 supracondylar amputations were performed in the group of 23 sympathectomized limbs, and both were within two months of the initial surgery.

Moderate disease involvement was thought to be present in the remaining 15 patients. Seventeen sympathectomies were performed. Four of these patients are dead, with sixty-one months as the longest observation period in the 11 living patients. Fourteen minor surgical procedures were performed in this group. Seven major amputations, one a below-knee amputation and the others supracondylar in type, were necessary in the 17 sympathectomized limbs. All were performed within five months of the initial sympathectomy.

Our follow-up studies on the 24 living patients in Group IV indicated that approximately 75 per cent were without distress. The remaining 25 per cent have noted a recurrence of symptoms varying from paresthesias to mild rest pain. Our postsympathectomy amputation rate in the *moderate subdivision* was 7 of 17 limbs, or 41 per cent. This indicates the difficulty in evaluating patients having moderate gangrenous changes and reveals the inevitable progression of the disease in some of these patients.

As with many other surgical procedures, the choice of patient and the thoroughness of operative technic determine, to a large extent, success or failure following sympathectomy. Absolute criteria are difficult to define, but there is general agreement that the presence of severe cerebral, cardiac, or renal arteriosclerosis or rapidly advancing gangrene is a contraindication to the use of this operation. The proper selection of individuals depends primarily on correct evaluation and interpretation of the degree of disease peripherally.

Variations in the ages of the patients, durations of symptoms, subjective interpretations of distress, and the amounts of tissue change present make for underestimation of severity. The physician's personal experience with such vascular problems has much to do with judicious selection of preoperative patients. Criteria then become relative. Those patients with *mild arteriosclerotic disease*, as evidenced by the complaints of numbness, coldness, and intermittent claudication, and who have minimal objective findings, are fairly certain of benefiting from such surgery. The procedure is not only therapeutic but prophylactic. *Moderate disease*, which is characterized by diminished to absent peripheral pulses, early trophic changes, small chronic ulcerations, or solitary digital gangrene, also benefits following sympathectomy. Mild rest pain or exertional cramping may or may not be noted. Often the beneficial effects do not become apparent in the limb until several weeks after surgery.

The results in Groups I, II, and the mild subdivision of Group IV demonstrate the value of this surgical procedure in these patients. Pratt[4] feels that, when the initial symptoms are those of claudication and coldness, 95 per cent of the patients will keep their limbs after sympathectomy. He further states that "even with gangrene five to six people out of every ten will not lose their leg after sympathectomy." He readily admits that the disease is progressive and that some patients may eventually lose their legs. The degree of gangrene present, the duration, and the general status of the peripheral circulation influence these results.

Severe peripheral disease involvement is characterized by intractable rest pain, noticeable trophic changes, absent pulses to palpation, and deep ulcerations or gangrene involving tissue proximal to the toes. The course of such disease is usually unaltered by the use of sympa-

thectomy. Limited benefits of short duration may be noted; however, high amputation usually becomes necessary as the disease progresses. In these instances, too much is expected from the operation by both surgeon and patient. If major amputations are necessary within six months of the sympathectomy, we now feel that the severity of the disease was underestimated and, in retrospect, primary amputation should have been recommended. Ostrove, in a recent article, re-emphasizes the fact that sympathectomy, as generally used, does not limit the extension of gangrene in advanced arteriosclerosis obliterans.[9] Some observers feel that the operation aids in delineating the site of amputation to a below-the-knee level in these cases. This has not been noted in our cases and its use in this manner has not been advised in our patients.

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Prevention of falls in the hemiplegic patient

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There are four groups of intrinsic factors which may increase the falling hazard in the hemiplegic patient —disturbances in circulation, impairment of righting reflexes, changes in motor function, and sensory involvement. In each instance, the most practical preventive measure to reduce risk of falling during ambulation is described for clinical application.

◆ Hemiplegic patients fall much more frequently than other elderly people. This is becoming a serious problem in rehabilitation, since many such patients fall and fracture the hip on their involved side and the number suffering injury is increasing as more severely disabled patients are being trained to walk. In this paper, I shall discuss some of the main reasons why hemiplegic patients fall, and suggest certain measures which can be taken to prevent such falls or to reduce their number. I shall deal arbitrarily with four groups of causative factors: (1) disturbances of cerebral circulation, (2) impairment in righting reflexes, (3) changes in motor functions,[1] and (4) sensory involvement. The possible number of interrelationships among these groups is very large and differentiation between them is rather artificial. Extrinsic factors, such as slippery floors, will not be be considered here.

Disturbances of Circulation

Episodes of transient cerebral anemia may be produced in most older people by a mild heart ailment, mild anemia, or disturbances of the reflex system of peripheral circulation. These tend to be most pronounced during changes from a supine to a sitting position, or from a sitting to a standing position, and lead to loss of balance and a consequent fall. The chances that such transitory cerebral anemia will result in falling are significantly increased in hemiplegic patients, in whom many of the reflex systems governing maintenance of upright posture are severely impaired.

Patients who are to be trained to walk and to perform many of the activities of daily life should be given a thorough medical examination with special attention to the functioning of the circulatory system under conditions of sudden changes in body position. Examination of the reflexes governing adjustment of the peripheral circulatory system during a change in body position are usually not included in a conventional examination. They are nevertheless most essential. To insure safety, the therapist will probably advise all his trainees to get up from bed gradually. They should first sit up and wait; then stand up, hold to the bed, and wait again; and, then only, attempt to walk. This should become a habit with every patient, even if it takes more time. Much of the advice to the patient is toward doing things more slowly.

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Changes in Righting Reflexes

In the elderly hemiplegic patient, many postural reflexes are found to be impaired. Such a patient easily loses control of his upright position while stretching his neck, as in reaching for something on a high shelf, or while turning his head sharply to the left or right, as in reaching for objects behind him. The patient should be advised to arrange his living quarters in such a way that he does not have to place objects on high shelves or hang clothes on high racks. When standing without support, he should avoid turning the head alone, but should turn the whole body slowly toward an object which lies behind him. When extreme head turning cannot be avoided, it should be done slowly, and he should look beforehand for objects to grasp or to lean against, in case he loses his balance. This careful planning of all prospective movements cannot be overemphasized during the rehabilitation of hemiplegic patients.

Anyone who has been in bed for several weeks will have a tendency to fall backward without being aware of it. This tendency is severe in some elderly people and pronounced in those who have suffered a brain injury. It is important for the therapist to know about it so that he may caution the patient. The tendency to fall backward can be overcome by having the patient walk frequently. Walking for ten minutes once or twice daily is not sufficient.

A small percentage of hemiplegic patients lean heavily toward the affected side. There is a reflex resistance to any effort to push them towards the objective upright. When leaning toward the involved side, these patients believe they are standing upright, and, when pushed forcibly into an upright position, they fear to fall to the other side. Having their center of gravity shifted toward the affected side causes them to fall quite readily. These are the most difficult cases in ambulation training. Patients must learn to disregard their faulty impression of their position in space. Training them to overcompensate and to lean heavily on a cane toward their good side will be rewarded if the training is conducted patiently over a period of several months. Yet these patients are able to walk only if they concentrate strenuously on the task, and any major distraction makes them lose balance and fall toward the involved side.

A commonly undiagnosed reason for poor coordination and falling is the swaying of the lower trunk in patients with hypertensive encephalopathy. These patients may have had a stroke with very mild hemiplegia, yet they are not able to walk properly. Careful observation may show unsteadiness of the lower trunk—suggesting multiplicity of small cerebral lesions—when the patient attempts to walk. A patient so disabled can be trained to walk safely without losing balance, if he is taught to walk very slowly, or, preferably, taught to walk with the intermittent double step gait, which will be described.

Motor Changes

A detail of general medical examination which is often not recorded or even evaluated is the function of the good side of the body.[2] When a severely handicapped patient puts his weight on the involved leg, he has to lean heavily toward the opposite side and the good hand, with a cane or other support to substitute for the impaired proprioceptive sensation of the involved leg. Similarly, the good hand takes over the balancing power of the involved leg, which thus plays only a supporting role. The degree of impairment of the good side of the body in a patient with a cerebrovascular accident is sometimes high. In order to ensure a safe gait, the good side must be evaluated and treated.

The changes in the locomotor func-

tion of the involved lower extremity are very interesting, since they are responsible for most falls. When we put weight on one leg during a normal walk, the calf muscles of the leg relax and elongate to control the gravitational forward fall of the body, which is so essential for economy of effort while walking. When the hemiplegic patient puts weight on the involved leg during this stance phase, he is not able to relax the spastic calf muscles. Because they are spastic and contracted, these muscles produce some resistance to the forward falling of the body. The patient may continue the swing phase of the good leg while the plumb line of the body's center of gravity remains behind the heel of the supporting leg. Obviously he may fall backward instead of moving forward. This is probably the most common cause of falls during the training period.

Some patients are able to compensate automatically; others must be trained to accept some means of overcoming this disability. A mildly spastic hemiplegic patient produces a greater propulsion of the good leg just before the start of the swing phase of the good leg. This usually gives enough propulsion to push forward the body's center of gravity. Some patients, instead of producing the forward push from the good leg, lean forward at the waist, in this way shifting the weight of the body in front of the hemiplegic foot. More severely spastic hemiplegic patients externally rotate the involved leg, thus removing the resistance produced by the involved calf muscles. If the hemiplegic patient does not learn automatically to overcome his disability, he should be instructed to imitate some or all of these prophylactic measures.

The degree of resistance produced by the spastic calf muscles may vary from day to day. This resistance may also change within a moment with the appearance of strong visual or auditory stimuli. The patient should be taught to stop walking automatically when something unusual catches his eye or when he hears a sudden noise.

A fairly large percentage of severely involved hemiplegic patients has prolonged flaccidity. These patients are easy to recognize, because the arm hangs limp at the side. They usually do not have to overcome the spastic plantar flexion of the foot, but they have an unstable knee and some, an unstable hip. The unstable knee is seldom taken care of satisfactorily by a long leg brace. An elderly person has great difficulty in adjusting himself to walking with such a brace. For this reason, if a brace is needed at all, a short one is prescribed and the patient is taught to walk with the unstable knee. Constant gait training will, with time, improve the stability of the knee. During this training period, the patient needs plenty of physical support and assistance from the therapist.

Many patients with prolonged flaccidity, as well as those with marked spasticity, must be trained to compensate with an immediate stop for the imbalance produced while they are putting weight on the involved leg. In this case, the patient stops immediately upon completing the swing phase of the good leg, in order to regain balance which was lost while the weight of the body was borne by a spastic leg or by a leg with an unstable knee. The stop must be long enough to prevent any forward movement of the trunk even if the legs do not move any more.

Summing up the sequence of movements once again, the patient does one step with the involved leg, another step with the good leg, and then stops. This produces a gait which we call the *intermittent double step gait.* Many patients have learned how to walk with a stop after every other step. They have learned to prevent a fall, by adopting this type of gait, which allows them to regain regularly the balance which is intermittently abnormal and which may otherwise

be lost. Disregarding this recovery of balance every two steps makes them fall.

A second variation of the intermittent double step gait is seen when the patient is taught to stop at the end of the swing phase of the involved leg. Here the swing phase of the involved leg is too slow to strike with that heel in time to counteract the physiologic forward fall when weight is put on the good leg. A stop at the end of the swing phase of the involved leg is substituted for the shock of imbalance produced by a too late restraint of the physiologic forward fall of the body.

It is most essential that, whatever policy the patient with prolonged flaccidity adopts concerning the limply hanging hand, he should be consistent in whether or not he uses a sling for the involved upper extremity. The uncontrolled change from one way to the other produces different balancing conditions with inadequate automatic adjustment and a possibility of a fall.

If they spend too much time sitting, some patients, with no evidence of flexion contractures of the involved leg, show a transitory flexion spasm of this leg while they are standing up. They usually do not realize this and try to walk straight ahead, putting weight on a leg with a flexed knee. Since this may lead to a fall, the patient should be taught to wait half a minute or more after he stands up before he starts to walk. This will give adequate time for the knee to go into extension.

There is a wide variety of patients with different degrees of flexion contracture of the involved knee. In this group is the patient with a mild flexion contracture of the knee who is able to walk without a long leg brace. He must be taught to adopt the intermittent double step gait, which slows his walking but makes it safe. Major degrees of flexion contracture of the involved knee can sometimes be dealt with by using a stabilizing long leg brace. The ring lock on the brace should always be on the inner upright. I have not seen many hemiplegic patients who, having had orthopedic surgery to reduce contracture of the involved knee, have been able to walk without assistance.

Mild osteoarthritic changes in the knee, which may not have elicited any complaints from the patient, may sometimes cause a painful knee after a cerebrovascular accident. This pain may frequently contribute to loss of balance and a consequently unsafe walk. These patients should be given the conventional management for an osteoarthritic knee.

Although the hemiplegic patient with an impaired foot-placing reaction is able to dorsiflex the foot, he really needs a short leg brace to stabilize the ankle joint. Otherwise, he will have difficulty placing the foot flat upon the floor when it strikes the floor at the end of the swing phase.

It is not the purpose of this paper to advise how to brace a patient who has had a cardiovascular accident with consequent hemiparesis. However, three occasions should be stressed in which inadequate bracing may cause the patient to lose control of his balance while walking.

First, there may be an inadequate angle of the involved foot at the shin. Under such circumstances, the toe of the shoe catches the floor and the patient may lose balance. Second, a 90-degree stop in a short leg brace may be put on a shoe which, because of an inadequately reinforced sole, is not able to maintain the 90 degrees throughout its length. The 90 degrees may thus be maintained at the heel of the shoe, but the front part gradually gives way and goes into plantar flexion. A conventional orthopedic shoe should be used to insure the 90-degree alignment between the shin and the front part of the foot. And third, any spring arrangements, including the Klenzak type, should not be used to maintain a spastic foot at a right angle to the shin. Such a spring action produces

and increases the tendency toward ankle clonus. The clonus so precipitated may be another reason for poor balance.

Sensory Involvements

The influence of sensory deficits on the ambulation of the hemiplegic patient has not been elaborated in the past. Recent findings will be discussed as they relate to the main theme of this paper.

Dr. Shontz, of the Department of Psychological Medicine of our hospital in Cleveland, has conducted investigations suggesting that many hemiplegic patients who were unable to walk at all, even after prolonged gait training, possess psychologic disturbances not attributable to intellectual deterioration alone. He reasons that these patients may possibly have brain damage on the dominant side of the cerebrum and, in addition, their body image of the hemiplegic side is seriously involved. If Dr. Shontz's findings would allow us to establish, with a high degree of reliability, the correct prognosis at the time of an initial examination, an enormous saving of time and effort could be achieved. In many instances, gait training of such patients has been tried from six to twelve months without success.

Following the hypothesis that falling might be related to the patient's faulty subjective appreciation of his position in regard to surrounding objects, Dr. Bruell and I began a study of space perception in the hemiplegic patient.[3,4]

I have mentioned that some hemiplegic patients believe they are standing upright, when actually they are leaning heavily toward the involved side. This would indicate that they do not perceive the difference between their body position and vertical features of the visual environment, such as walls, window frames, and table legs. In our study, we found that, in a dark room, most hemiplegic patients cannot adjust a luminous rod to objective verticality. Deviations of 20 degrees and more from the objective vertical are not at all uncommon. In a dark room, a luminous square which is tilted 30 degrees is seen as upright by a significant number of patients. Control patients with spinal cord injuries, and consequent severe involvement of position sense bilaterally, do not show such disturbances of visual space perception.

This point is emphasized because patients with impaired proprioception resulting from spinal cord lesions—tabetic patients, for example—maintain an upright posture by "visual anchoring." The findings of our study suggest that hemiplegic patients cannot adequately compensate for their loss in proprioception by visual anchoring, especially when moving around in a dim room. Under conditions of poor lighting, patients misjudge their position in space and fall. Therefore, the hemiplegic patient should be advised never to get up and walk in a dark or dimly lighted room. When this is unavoidable, he should be doubly cautious and grasp neighboring objects such as beds, chairs, and tables. It should be made clear to the patient and to his family that these precautions have nothing to do with night blindness. The patient may see quite well in the dark and yet be disoriented as to body position.

Clinical experience has shown that, if someone passes close to his good side, the more severely involved hemiplegic patient has a tendency to fall toward his affected side. Thirty years ago, Simons tried to explain this tendency in terms of the tonic neck reflex.[5] Such a patient turns his head toward the good side in order to see the person passing by. This head turning increases the flexion reflexes on the affected side and thus produces falling toward that side. This interpretation may be correct, and, therefore, in an earlier section, we advised training patients to avoid strong head turning when standing without support. Such advice obviously applies even more to a patient who is walking. Thus, although we agree with Simons,

we believe that head turning is only one of the reasons for falling in the situation described, and that such falling can occur also with the patient continuing to look straight ahead.

Very simple experiments will show that everyone misperceives the position of objects which are to one side. For instance, at night we perceive the headlights of an oncoming car as closer to us than they really are. We have found by experiment that this illusion is pronounced and even exaggerated in hemiplegic patients. Thus, if someone passes close to the left side of a patient, the patient sees the person as nearly running into him, and moves to the right to avoid the collision. A left-sided hemiplegic patient, holding a cane in his right hand, can do so safely, but a right-sided patient will shift his center of gravity too far toward the involved right side and fall. To avoid such accidents, we teach our patients to stop whenever a person is going to pass, and to lean still more toward the good side, at the same time concentrating on maintenance of steady balance.

These directions apply particularly to that considerable number of hemiplegic patients who have hemianopsia. In addition to having a visual field half the normal size, such patients show disturbances of space perception. Those with a loss of the left half of the visual field will see all objects placed more left than they actually are, and vice versa. If a patient with left hemiplegia and loss of the left half of the visual field meets someone about to pass him on his good right side, he will believe the person to be dangerously close, and, in moving to the involved side to avoid collision, will probably fall.

More severely involved patients fall not only when people pass too close to their good side, but also, when walking, they allow their good side to come too close to objects, as in turning a corner or entering a room. However, entering a room with the involved side close to the door frame does not precipitate falling. Again we suspect distortions of visual space may be one of the reasons for falling under these conditions. Consequently we train patients to go through doors with extreme caution and to leave at least one foot between their uninvolved side and the door frame.

Even though this program for preventing falls may seem beyond the comprehension of some hemiplegic patients, we believe that those with poor mental status or emotional control should not be kept from learning how to walk, and, if possible, how to be independent at home. We realize that what the patient carries over from his training period to application in the home may be inadequate. Many patients will not understand some of the details aimed at accident prevention and safety of walking. Nevertheless, the gains achieved by ambulating such patients far exceed the risk associated with the patient's inability to learn all the details required for prevention of falls.

A person familiar with gait training of severely involved hemiplegic patients will learn quickly, from a short observation of a new patient, the most likely reasons why this particular person may fall. Gait training should include adequate preventive measures and protective habits to be continued when independence is achieved. Often these patterns can be learned only during a very long training period.

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Hydroxyzine: a new therapeutic agent for senile anxiety states

A preliminary report

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The therapeutic effect of hydroxyzine, a new drug inducing calmness, was studied in 54 patients, ranging in age from 65 to 90 years, with various degrees of senile anxiety. Good to excellent improvement was shown in 51 of the 54 patients treated. No untoward effects on liver, blood, and nervous system were observed.

◆ An oral preparation, Atarax, with the generic name hydroxyzine hydrochloride, has been used by various clinical investigators both here and abroad for treatment of psychoneurotic-like symptoms. The consensus appears to be that this agent has a definite calming effect on nervous and agitated subjects with symptoms such as fatigue states produced by an inability to relax, often encountered in industry; anxiety before college examinations and before important speeches; premenstrual tension; menopausal disturbances; and other situations where emotional stress is prominent.

In the later years of life, some patients may develop psychosomatic complaints caused by changes in living conditions, the loss of spouse, and economic changes following retirement. The symptoms then cause fears which produce further anxiety and symptoms, resulting in a vicious cycle of worry and incapacitation.

Psychoneurotic-like symptoms are often found in hypertensive states, such as generalized arteriosclerosis. Keys states that physical and emotional stress have some effect on the cholesterol metabolism in man.[1] The appearance of micromolecules of low specific gravity and containing cholesterol have been reported in the blood serum of more than 90 per cent of patients with arteriosclerosis of the coronary arteries.[2]

Chemistry and Pharmacology

Atarax is a p-chlorobenzhydryl piperazine derivative, chemically designated as 1-(p-chlorobenzhydryl) -4-[2-(2-hydroxyethoxy) ethyl] diethylenediamine (figure I). The hydrochloride of this compound is a crystalline solid readily soluble in water and rapidly absorbed from the gastrointestinal tract.

Administration of an oral toxic dose of hydroxyzine hydrochloride to mice produced only depression, while rats responded with depression, tremor, and ataxia.[3] Rats given hydroxyzine hydrochloride became quiet within a short time and their movements became slower

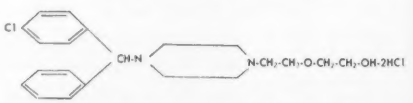

FIG. 1. *Structural formula of hydroxyzine hydrochloride.*

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TABLE 1

CROSS SECTION OF RESULTS AFTER TWO MONTHS OF ATARAX THERAPY

Patient	*Age*	*Sex*	*Dosage*	*Diagnosis (see key*)*	*Calming effect*
E.E.	73	F	10 mg. q.i.d.	GA	Pronounced
M.W.	76	F	10 mg. q.i.d.	GA	Good
E.A.	75	F	25 mg. q.i.d.	CA	Pronounced
M.L.	68	M	25 mg. q.i.d.	CA	Good
M.H.	69	F	10 mg. q.i.d.	CA	Pronounced
N.B.	72	M	10 mg. q.i.d.	CA & AH	Pronounced
J.B.	76	M	25 mg. q.i.d.	CA & GA	Pronounced
A.W.	78	F	25 mg. q.i.d.	CA & GA	Good
N.M.	80	F	10 mg. q.i.d.	CA & GA	Pronounced
M.N.	76	M	25 mg. q.i.d.	CA & GA	Good
A.S.	68	F	25 mg. q.i.d.	CA & TP & CB	Pronounced
R.A.	71	M	10 mg. q.i.d.	GA & CRA	Pronounced
L.R.	78	F	10 mg. q.i.d.	GA & DM	Pronounced
O.A.	69	M	10 mg. q.i.d.	GA & RA & AH	Good
B.O.	65	F	10 mg. t.i.d.	GA & DU	Pronounced
J.R.	67	M	10 mg. q.i.d.	GA	None
G.O.	78	F	25 mg. q.i.d.	CA & GA	None
E.A.	74	F	Placebo	CA	None
A.W.	78	F	Placebo	CA & OMV	None

*Key to diagnosis:
GA—generalized arteriosclerosis
CA—cerebral arteriosclerosis
TP—taboparesis
CB—carcinoma of the breast
CRA—carcinoma, right antrum
DM—diabetes mellitus
RA—rheumatoid arthritis
DU—duodenal ulcer
AH—arterial hypertension
OMV—occlusion of major vessel

and steadier, but when threatened from the outside, they got up and ran with their customary agility and alertness.

Four groups of monkeys, with two animals in each group, were given hydroxyzine hydrochloride in oral doses of 25, 50, 100, and 200 mg. per kilogram of body weight. An additional group of four monkeys received oral doses of 400 mg. per kilogram of body weight. No effect on the behavior of the animals was noted after oral administration of 25 to 400 mg. of hydroxyzine hydrochloride per kilogram of body weight.

Farah observed that the preparation produced more calmness and peace of mind in overemotional patients with anguish and anxiety symptoms than any drug used previously.[4] Settel found that 73 per cent of 30 patients experienced relief of tension, felt more relaxed, and had better control of their tempers.[5]

Clinical Study

Our study series consisted of 54 patients ranging in age from 65 to 90. Some of the patients had generalized or cerebral arteriosclerosis, alone or combined with other conditions, such as arteriosclerotic heart disease and essential and renal hypertension. Some had duodenal ulcers and diabetes mellitus. Placebos were given to 5 patients for the control of

TABLE 2

RESULTS OF LIVER FUNCTION TESTS AFTER TWO MONTHS OF ATARAX THERAPY

Patient	*Sex*	*Bilirubin (1-45 min.)*	*Thymol turbidity*	*Bromsulphalein (% retention)*
V.G.	M	0.15	0.5	6.0	10
J.M.	M	0.6	1.0	4.0	2
A.R.	F	0.3	0.5	8.5	3
B.M.	F	0.6	0.8	7.5	14
A.P.	F	0.4	0.6	4.5	12
E.E.	F	0.15	0.3	8.0	3
M.H.	F	0.2	0.4	3.0	8
M.W.	F	0.3	0.5	2.5	6
R.A.	M	0.25	0.6	11.0	7
N.B.	M	0.15	0.3	6.0	9
O.A.	M	0.2	0.3	10.0	7
L.R.	F	0.65	1.0	9.0	6
N.M.	F	0.3	0.5	7.0	8

therapeutic results. Two of the control patients were later institutionalized for cerebral arteriosclerosis with senile dementia, manifested in severe agitation, loss of affect, and erratic behavior. Atarax, in the form of 10- and 25-mg. sugar-coated tablets, was administered in doses of 3 to 4 tablets daily after meals, during a period of one to five months.

Results

Most of the patients assimilated the tablets rapidly. According to clinical and laboratory studies, hydroxyzine hydrochloride probably acts on the subcortical area of the brain. A calming effect was noted after three to four days and persistent effect after six to seven days. No increase in the calming effect was observed after seven days of therapy.

In an evaluation of the results, 41, or 76 per cent of the 54 patients treated, showed pronounced improvement; 10, or 18.5 per cent, showed good improvement; and 3, or 5.5 per cent, showed no improvement (see table 1). No evidence of toxicity has been observed to date. Complete liver function tests and blood studies were made on all patients after two months of therapy (tables 2, 3, and 4). In a period of forty-five minutes there was bromsulphalein retention range from 2 to 14 per cent; hemograms showed a range of 12.5 to 17.2 gm.; red cell blood count ranged from 4,010,000 to 6,600,000; and white cell blood count ranged from 5,400 to 14,000 with normal differentials. As can be seen, there were no significant abnormalities.

Hydroxyzine therapy showed no adverse effects on cerebral and generalized arteriosclerosis; cerebral arteriosclerosis; or on generalized arteriosclerosis combined with rheumatoid arthritis, carcinoma of the right antrum, or carcinoma of the breast (postoperative). Arterial hypertension of essential and renal origin, duodenal ulcers, and diabetes mellitus remained unchanged. The white blood cell count made after two months of hydroxyzine therapy showed no evidence of agranulocytosis (table 3).

TABLE 3

BLOOD COUNTS AFTER TWO MONTHS OF ATARAX AND PLACEBO ADMINISTRATION

Patient	*Sex*	*Hemoglobin gm.*	*R.B.C.*	*W.B.C.*	*Polynuclears*	*Lymphocytes*	*Monocytes*	*Eosinophils*	*Basophils*	*Young lymphocytes*
Atarax:										
V.G.	M	14.5	4,340,000	12,000	60	37	2	1		
J.M.	M	14.9	4,650,000	12,100	75	24	1			
A.R.	F	15.3	4,590,000	9,300	75	24	1			
B.M.	F	14.9	6,200,000	14,000	80	16	4			
A.P.	F	12.5	4,010,000	8,600	64	33	1	2		
E.E.	F	15.7	5,010,000	9,200	64	34	1	1		
M.H.	F	15.3	4,660,000	8,000	64	30	6			
M.W.	F	16.2	5,160,000	8,200	55	44		1		
R.A.	M	17.2	5,220,000	11,200	64	30	6			
N.B.	M	16.6	6,600,000	8,200	72	20	6		2	
O.A.	M	14.9	4,360,000	9,000	57	38	3		Bands 2	
L.R.	F	14.5	4,500,000	6,200	43	51	5			1
N.M.	F	13.7	4,010,000	5,400	66	32	2			
Placebo:										
E.A.	F	10	3,500,000	8,000	65	30	3		2	
A.S.	F	14	4,930,000	4,300	64	32	4			
M.L.	M	13.5	4,250,000	4,750	64	31	2	3		
J.B.	M	13.5	4,570,000	9,200	58	33	4	2		3
A.W.	F	12.5	4,370,000	9,700	68	26	3	3		

TABLE 4

LIVER FUNCTION TESTS AFTER PLACEBO ADMINISTRATION

Patient	*Sex*	*Bilirubins Direct (mg. %)*	*Indirect (mg. %)*	*Total (mg. %)*	*Thymol in units (Normal = 0 to 5 units)*	*Bromsulphalein 5 mg./kg./body wt. (Normal = 0 – 5% in 45 min.)*
E.A.	F	0.15	0.15	0.3	10.5	15% in 45 min.
A.S.	F	0.4	0.2	0.6	2.5	5% in 45 min.
M.L.	M	0.2	0.2	0.4	1.0	11% in 45 min.
J.B.	M	0.3	0.3	0.6	2.0	3% in 45 min.
A.W.	F	0.15	0.1	0.25	1.0	19% in 45 min.

Complete electroencephalographic tracings were made of 3 additional patients, before and one week after therapy with hydroxyzine, 10 mg. four times a day and 10 mg. preceding the second electroencephalogram. Two patients, C.W., an 85-year-old woman, and J.L., an 88-year-old man, had normal tracings before and after therapy with no changes. The third patient, S.R., a 75-year-old woman, had an abnormally slow electroencephalogram with no focus before hydroxyzine and no change after therapy. It is well known that many sedatives, particularly barbiturates, will alter the normal electroencephalogram.[6] Usually fast activity is increased, but no evidence of this or other changes were found in the patients examined.

When placebos were substituted in some of the patients, a recurrence of symptoms was noted. Administration of Atarax was thought to be especially indicated for cerebral arteriosclerosis, in which use of the common depressants may cause bromide and barbiturate intoxication.[7] It was found that patients with occlusion of a major cerebral vessel did not respond to treatment. Patients who were in an agitated or a somewhat depressed state – conditions which may result after multiple little strokes[8]—responded best to hydroxyzine therapy. All patients treated, except those who responded poorly, reported that they did not feel as fidgety after therapy, and were able to sleep better. In this group, no drowsiness, dryness of mouth, or nasal stuffiness was reported. In most patients, the administration of 10 mg. of Atarax three or four times a day appeared to be sufficient to induce a calming effect. Doses of 25 mg. three or four times a day were not superior in action.

Discussion

In 5 patients, hydroxyzine hydrochloride, 10 to 25 mg. three times daily, was substituted for chlorpromazine hydrochloride, 25 to 50 mg. three times daily with good or even superior calming effect. It was further noted that, in hypertensive patients, the therapeutic effect of Rauwolfia serpentina in 50 mg. doses given two to four times daily was potentiated by hydroxyzine therapy.

The product Atarax used in this study was supplied by J. B. Roerig and Company, a division of Chas. Pfizer & Co.

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Editorial

Compulsory retirement revisited

SHORTLY after President Roosevelt's Supreme Court reorganization plan was rejected by Congress in 1937, Charles Fairman, in an article in the *Harvard Law Review*, discussed compulsory retirement of Supreme Court judges as a possible solution for the recurring problem of judicial conservatism.[1] This article stimulated intelligent discussion but did not provoke immediate action by Congress. In 1948, however, several members of the American Bar Association began serious reconsideration of the problem of retirement as part of a broader study of ways and means to insure the continued independence of the federal Supreme Court. The results of this study were incorporated in a proposed constitutional amendment, generally designated the Butler Amendment.

Section 2 of the Amendment, which deals with compulsory retirement, provides that

> The Chief Justice of the United States and each Associate Justice of the Supreme Court shall cease to serve and shall no longer be eligible to serve as a member of the Supreme Court upon attaining the age of 75 years, but shall continue to receive all the emoluments of his office.

In a statement before the Subcommittee on Constitutional Amendments of the Senate Judiciary Committee, Albert E. Jenner, Jr., rationalized the retirement provision as insurance "against physical and mental impairment of individual justices . . ." and as "assurance against stagnation of particular economic, political, social, or philosophical thought on the part of the Court."[2] Thus, the compulsory retirement provision was designed to remove one of the major sources of criticism of the Court in the past—namely, that members of the Court, many of whom tended to read their personal social, and economic predilections into the Constitution, were frequently out of step with the times.

The Constitution provides that "the Judges, both of the supreme and inferior courts, shall hold their offices during good behavior . . ." Death accounts for most of the vacancies which occur. The only constitutional provision for removal of justices is that of impeachment. But impeachment does not take care of ideologic stagnation or senility in the Court because, unless abused, the impeachment power applies only to justices who have committed high crimes and misdemeanors. The last attempt to make impeachment of justices a political sanction, in the case of Justice Samuel Chase, was defeated in 1805. Since that date, no serious efforts at political removal have occurred.[3]

Two voluntary institutional devices, retirement and resignation, have been available to members of the Supreme Court for a number of years. The statute governing these matters provides adequately for those justices who might be deterred from retirement and resignation because of loss of income.[4] But most members of the Court who have re-

frained from or delayed in utilizing these avenues to private life were not motivated by economic considerations. Some members of the Court clung to their posts despite senility because they hoped to prevent appointments by presidents whom they distrusted or whose political beliefs they opposed. Others delayed retirement because they feared inactivity, or because they wanted to "establish an endurance record." After completing a detailed analysis of the Supreme Court's experiences with voluntary retirement and resignation, Professor Fairman concluded that, "For the most part the justices have seen fit to follow the American plan of living—to carry on to the end."

Thus it appears that neither the process of impeachment, nor retirement, nor resignation provides a realistic, workable method for removing justices who have become senile or ideologically out of step with the times. In this setting, a compulsory retirement plan has been viewed by some, such as the supporters of the Butler Amendment, as the only practical solution to situations in which mentally or physically infirm justices remained on the Court or in which justices steadfastly opposed the legislative and executive actions needed by a new constitutional era.

While the arguments for such a compulsory retirement amendment are admittedly cogent, several questions demand attention. The first of these is whether it is valid to assume that poor health is a concomitant of old age. This assumption finds support in a great deal of historic evidence, although such evidence was not produced by the advocates of compulsory retirement at the Senate subcommittee hearing on the Butler Amendment. There are numerous instances in which members of the Supreme Court remained in regular service long after their mental and physical powers had become impaired. Justices Baldwin and Clifford deteriorated mentally during the later portions of their terms; in a period during which the Court relied heavily upon extended oral argument, Justice Duval suffered from deafness; Chief Justice Chase experienced a stroke and paralysis during the closing years of his tenure; and Chief Justice Taney and Justices Mc Kinley, McLean, Wayne, Catron, Grier, Nelson, Hunt, Bradley, and Field all became physically infirm.

Admittedly, research in geriatrics is fragmentary. Nevertheless, we know that the average life expectancy at birth has increased from 49 to 68 years during the past half century. Statistics also show that the incidence of illness is higher among the aged than among other population groups.[5] Of particular importance is the finding that, while aging brings a decline in the speed of mental processes and in manual dexterity, there is a significant variation in the rate of those changes among individuals. Thus, changes in functional capacities do not correlate with chronologic age.[6]

The second assumption which provides a basis for advocacy of the Butler Amendment is that there is a necessary relationship between old age and outdated ideas. However, the belief that older persons are more conservative in their attitudes and opinions has not always been upheld in experimental studies. Research has indicated that the aged can learn, and learning can open the way to acceptance of new ideas. Psychologic tests of speed of performance provide evidence that older people are more careful and accurate than younger ones. Consequently, the conservatism of the aged may be related to their tendency to be more deliberate rather than to inherent inflexibility.[7]

The history of the Supreme Court reveals, moreover, that some members of the Court retained the capacity to tolerate, if not accept, novel social, political and economic ideas long after the age of 75, while others lost that capacity

many years before that age. Thus, when Justice Holmes resigned at 91 and Justice Brandeis retired at 83, they were more tolerant of social, economic, and political innovations by the legislatures than were Justice McReynolds at 52 and Justice Sutherland at 60, the ages at which they were appointed to the Court. It should also be noted that the same judicial self-restraint characterized much of the decision-making under Chief Justices Taney, Waite, Stone, and Vinson.

The basic attitude of individual justices toward the nature of the judicial process would appear to be far more important than chronologic age in determining the extent to which they will remain flexible when faced with new problems. It would also appear that the appointing authority is a more important factor than age in determining the Court's attitude at a given period in history.

Presidents have admitted this with varying degrees of subtlety. Washington referred to the necessity for sound appointments as "essential to the happiness of our country and the stability of its political system." After his defeat by Thomas Jefferson, John Adams wrote bluntly that, "In the future administration of our country, the firmest security we can have against visionary schemes and fluctuating theories will be in a solid judiciary . . ." Jefferson was similarly blunt when he suggested that his successor, Madison, replace Federalist Justice Cushing with "a firm unequivocal republican, whose principles are born with him, and not an occasional ingraftment, as necessary to complete the great reformation in our government to which the nation gave its fiat ten years ago." And Theodore Roosevelt wrote to Senator Lodge concerning the possible nomination of state judge Oliver Wendell Holmes: "I should hold myself guilty of irreparable wrong to the nation if I should [appoint] any man who was not absolutely sane and sound on the great national policies for which we stand in public life."[8]

It thus seems possible that, by arbitrarily cutting off the services of justices at 75, we risk the loss of services of men of broad vision without the assurance of compensatory gain. Some may feel, of course, that it would be better to risk loss of justices of broad vision than to suffer the decision-making of justices like Field and Grier who continued to serve after senility had set in. But the problem caused by loss of experienced members of the Court could become acute, particularly if the average age of appointment is taken into account.

The average age of appointment of Supreme Court members has risen from 47.5 in the early years of the Republic to 57 in the first third of the present century.[9] Compulsory retirement at 75 would have seriously curtailed the period of fruitful service of such justices as Holmes, Cardozo, Brandeis, and Hughes, who were sexagenarians at the time of their appointment. Considered in conjunction with the assumed benefits of the proposed amendments, curtailment of the valuable services of eminent justices seems unwarranted. In short, passage of the Butler Amendment would probably create problems more serious than those it seeks to solve.

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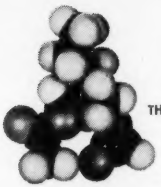

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NO ORGANIC CONTRAINDICATIONS

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- no blood dyscrasias, liver toxicity, Parkinson-like syndrome or nasal stuffiness
- chemically unrelated to chlorpromazine or reserpine
- does not produce significant depression
- orally effective within 30 minutes for a period of 6 hours

Indications: anxiety and tension states, muscle spasm.

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the original meprobamate— 2-methyl-2-*n*-propyl-1,3-propanediol dicarbamate—U.S. Patent 2,724,720

SUPPLIED: 400 mg. scored tablets. Usual dose: 1 or 2 tablets t.i.d.

DISCOVERED AND INTRODUCED by Wallace Laboratories, New Brunswick, N. J.

Literature and Samples Available on Request

33A

Digests
FROM CURRENT LITERATURE

Modified Electroshock Therapy: Use in the Elderly Psychiatric Patient

H. J. RIETMAN and E. DEGADO-FOURZAN. Connecticut M. J. 20: 21-23, 1956.

Modified electroconvulsive treatments have been found to be safe and effective in patients over 60 for psychiatric conditions with an element of depression. Forgetfulness, confusion, disorientation, mental and behavioral deterioration, signs of cerebral arteriosclerosis or cortical atrophy, are mimicked or exaggerated by curable emotional disorders. The common depressions of older people, precipitated by awareness of mental deterioration, dissolution of family relationships, loss of contemporaries, and anticipation of death, account for the effectiveness of electroshock.

The patient's stomach should be empty. Premedication of 0.8 mg. atropine sulfate is given. After induction of light anesthesia with Pentothal Sodium, Succinylcholine is given intravenously to produce generalized muscle relaxation. Because the respiratory muscles are also paralyzed, bag breathing is used before and after the electrical stimulus until normal respiratory function returns.

A total of 963 treatments were given without complication to 71 private patients over 60 years of age. Relapse occurred in 16 patients after therapy was discontinued. Nine of the patients with recurrences improved with a second course; 7 required prolonged maintenance. Sixty-three of the patients were discharged, with only 5 requiring readmission.

What Is Aging?

A. I. LANSING. Bull. New York Acad. Med. 32: 5-13, 1956.

Aging is a process of unfavorable progressive change, usually correlated with time, becoming apparent after maturity, and terminating invariably in the death of the individual. The process cannot be accounted for by failure of organ systems, for all multicellular living things share the common fate.

Failure of the self-synthetic ability of living cells best accounts for the phenomena of aging. Inadequate renewal of the cell surface results in increased calcium content of the cell membrane and accumulation of toxic materials in the cell.

Decreased growth potential is evident in old liver cells in the rat by decreased P^{32} uptake and increasing lag of cytoplasm and nucleus division behind chromosome multiplication.

In the flatworm and the rotifer, progeny of actively growing organisms live longer than progeny of slow growing or elderly forms. The flatworm divides into an anterior half which grows only a tail and a posterior half which regenerates trunk and head. Posterior half lines live longer. Lines of rotifers derived from adult mothers by parthenogenesis decrease in longevity each successive generation, the number of generations needed for extinction depending on the age of the mother. Offspring of actively growing adolescents increase in lifespan each generation.

No relationship has been found between the average length of life of the individuals composing a species and any fact of life history, structure, or physiology.

Natural death is a new phenomenon in evolution, occurring necessarily only in multicellular animals, although some protozoa do age and die. The somatic death of higher organisms is a price paid for specialization of structure and function.

Hyperplasias, Metaplasias, and Adenomas in Senescent Male Rats Intact or Treated with Hormones

V. KORENCHEVSKY. Texas Rep. Biol. & Med. 13: 768-792, 1955.

Study of the incidence of adenoma-like structures in hormone-treated senescent rats suggests that endocrine factors may possess both onco- and antioncogenic properties depending on dosage, deficiencies in the endocrine system, age, and sex. With the onset of the first changes of senescence in normal rats, small nests of hyperplasias or metaplasias appear in various organs. Some of the nests become adenomas; all must be considered quiescent centers of neoplasm.

The effect of hormones on this normal phenomenon of aging was studied in 176 aged rats.

(Continued on page 36A)

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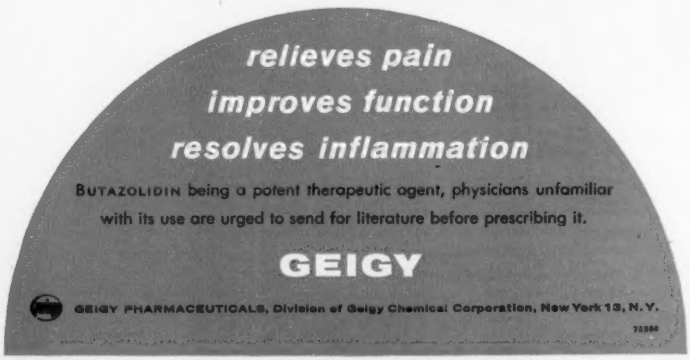
(phenylbutazone GEIGY)

potent, specific anti-arthritic

Based on an impressive background of achievement attained over a period of four years involving both long-term and short-term therapy in all the major forms of arthritis, BUTAZOLIDIN is recognized as one of the most effective anti-arthritic agents currently available.


relieves pain
improves function
resolves inflammation
BUTAZOLIDIN being a potent therapeutic agent, physicians unfamiliar with its use are urged to send for literature before prescribing it.
GEIGY
GEIGY PHARMACEUTICALS, Division of Geigy Chemical Corporation, New York 13, N. Y.

(Continued from page 34A)

One group was given large or small doses of testosterone, and desiccated thyroid in various combinations with an average dose of estradiol. A second group was given small doses of sex hormones, thyroid hormones, and cortisone acetate. In a third experiment, the same endocrine substances were used as in the second group but with larger doses of cortisone. Controls were reserved in each study.

The thyroid and parathyroid glands of each animal were sectioned serially, so an accurate count of metahyperplastic structures was possible. Other organs were examined less thoroughly.

More thyroid metaplasias and hyperplasias occurred in the hormone-treated rats than in controls, but the growths were no larger. The incidence and size of adrenal cortical tumors were increased by hormones.

When testosterone, desiccated thyroid, and estradiol were given together, no metahyperplastic structures were found in the thyroid or the adrenal. No consistent additive effect on the incidence or size of the structures occurred with increases in dosage or simultaneous administration of several hormones.

Presenile Dementia of the Jakob Type

S. BORNSTEIN and G. A. JERVIS. Arch. Neurol. & Psychiat. 74: 598-609, 1955.

Presenile dementia is a psychosis occurring in the presenium and characterized by intellectual deterioration organic in type. The etiology of the disease is unknown. The disease affects both men and women during the 40's and 50's, but not infrequently those in the 30's. The course of the disease is relatively rapid.

The psychosis is characterized by memory defect, apathy, and intellectual deterioration. Euphoria and delusions of grandeur are sometimes present.

The pathologic findings are degenerative parenchymatous changes of the cerebral cortex varying from acute swelling to sclerosis, pigmentary degeneration, and complete destruction of the neurons. The cortical lesions are irregularly diffuse, with focal accentuation of the process. Concomitant neuroglia reaction is usually present. Thalamic nuclei are involved in a manner similar to that of the cortex. Even more variable are the lesions in the nuclei of the motor cranial nerves and the anterior horns of the spinal cord. The spinal lesions are outstanding in some and minor in others.

Gynecologic Surgery in the Geriatric Patient

J. H. PRATT. J. Arkansas M. Soc. 52: 173-178, 1956.

Surgical treatment of gynecologic conditions need not be avoided purely on the basis of the patient's age, since, other factors being equal, an older patient's tissues heal just as well and nearly as quickly as those of the young person. Aging produces changes particularly in the heart, lungs, and kidneys that reduce the recuperative margin. If time allows, all factors decreasing functional capacity of secondarily diseased organs should be improved preoperatively.

Pelvic surgical emergencies in geriatric patients should be treated promptly with but a few hours devoted to preoperative management. Examples of surgical emergencies include twisted ovarian cyst, acute appendicitis, incarcerated hernia, and severe vaginal hemorrhage.

Chronic conditions, which are frequently the result of gradual loss of tissue tone leading to cystocele, rectocele, prolapse, and incontinence, allow time for consideration. If pelvic relaxation causes distress and limits normal activity, some therapy is needed. Pessaries may help in selected patients with fair perineal tissues, but surgical treatment is preferred and fortunately carries a low risk. Vaginal hysterectomy can be done entirely under local anesthesia, and further reduces anesthetic hazards.

Difficulties in Geriatric Diagnosis

E. J. STIEGLITZ. Maryland M. J. 4: 517-526, 1955.

There are many difficulties in the diagnosis of the clinical problems presented by aging and aged patients. Response to any form of stress which tends to disturb homeostatic balance becomes less rapid and less vigorous with age. A considerable diagnostic acumen is required in order to recognize the subtle early changes which are the first evidences of illness. Aging is associated with functional depreciation even in the absence of known disease. Especially significant is depletion of reserve capacities, for these are clinically silent until loss is revealed by stress.

Incidence of certain disorders increases greatly with advancing age. Four groups of diseases constitute the common and most significant disorders seen in geriatric practice: (1) circulatory impairments, (2) metabolic dysfunctions, (3) the arthritides, and (4) malignant neoplasms. The etiology of the disorders of the aged is obscure, endogenous, multiple, variable, and slowly cumulative.

(Continued on page 46A)

Newest in vitamin therapy

Vitamins as nature intended . . .

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THE HOMOGENIZED VITAMINS

For the first time, all the advantages of multivitamin drops are available in a tablet. By a unique process, the vitamins are homogenized, then fused into a solid, highly palatable form.

As a result of this minute subdivision, the vitamins are absorbed and utilized much more efficiently than those in the usual compressed tablet or elastic capsule.

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Three formulas:

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*U.S. Patent 2676136

Book Reviews

Pathologic Physiology — Mechanisms of Disease

WILLIAM A. SODEMAN, editor, 1956. Philadelphia: W. B. Saunders Co. 936 pages. $13.00.

The physiologic approach to problems of disease has become so important to everyday medicine that it is surprising that so few attempts have been made to provide books which deal systematically with the physiology of disease states. The present work is a compilation of chapters by 29 authors, all productive investigators, and most of them teachers in medical schools. The chapters cover such subjects as the genetics of abnormal growth and neoplasia, metabolism, endocrinology, water balance, electrolyte balance, infectious diseases, allergy, circulation, respiration, digestion, locomotion, and the nervous system. Much of the material in the book is similar to that found in the more comprehensive textbooks of physiology, but there is properly a greater emphasis on clinically applicable material.

The fact that a second edition has been published six years after the first indicates the need for a book of this sort. Nevertheless, one may note that it has its defects. Only one of the 29 authors is a professional physiologist, a fact which is evident in the text in several ways. For example, statements are made that certain principles are "obviously correct," when, as a matter of fact, they may be only approximations and valid only under special conditions. Despite this overenthusiastic acceptance of current views as final, the volume is a real contribution. It provides a ready access to recent literature on important clinical applications of physiology and should be very useful to beginning clinical investigators and to professional physiologists wishing to know how clinical scientists are using physiologic knowledge to understand and treat disease.

MAURICE B. VISSCHER, M.D.
Minneapolis, Minnesota

The Biologic Effects of Tobacco: With Emphasis on the Clinical and Experimental Aspects

ERNEST L. WYNDER, M.D., editor. 1955. Boston: Little, Brown and Company. 215 pages, illustrated. $4.50.

It is the purpose of this book to review as objectively as possible what is known about the relationship, if any, of tobacco smoke and human ill health. Eight highly qualified contributors

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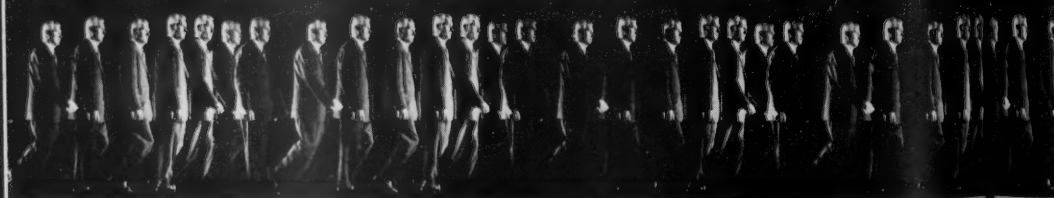
helps your peripheral vascular patients walk



"strong muscle vasodilator activity and an adequate increase in cardiac output"[1]

in intermittent claudication
diabetic vascular disease
Raynaud's disease

thromboangiitis obliterans
ischemic ulcers
night leg cramps

arlidin* HCl
brand of nylidrin hydrochloride
tablets 6 mg.

dose: 1 tablet t.i.d. or q.i.d. bottles of 50, 100 and 1000.

deal with seven aspects of the subject: chemistry, pharmacology, the cardiovascular system, neoplastic disease, the gastrointestinal tract, allergies, and cause and effect. The concluding chapter, by Professor E. C. Hammond of Yale University, which sums up the philosophy of etiologic analysis by statistical correlations, deserves careful study by everyone interested in any aspect of chronic disease.

The book is conservative. All statements of "facts" are well documented; each chapter includes an adequate but by no means cumbersome bibliography. Clinicians, and especially those concerned with the care of the aging and aged, will find the chapters on the cardiovascular system (Ellen McDevitt and Irving S. Wright), neoplastic disease (Ernest L. Wynder), and the gastrointestinal tract (Robert C. Batterman) particularly useful.

As a basic reference, a concise summary of what is now known, this small, easily studied volume has great value. It is critical, sound, and sufficiently comprehensive, although one wishes that there were some amplification of *contrary* evidence. To mention that such evidence exists and produces some doubts as to the validity of apparent correlations implies the *intent* to be objective, although the accomplishment is actually a cautiously phrased indictment of evils of tobacco smoking.

EDWARD J. STIEGLITZ, M.D.
Washington, D. C.

Books and publications received will be listed here each month. Books of special interest to our readers will be reviewed later as space permits.

Medical Clinics of North America: Medical Problems of the Aged. Philadelphia: W. B. Saunders Co., January 1956. 270 pages.

Experimental Tuberculosis: Bacillus and Host Addendum on Experimental Leprosy. G.E.W. WOLSTENHOLME and MARGARET P. CAMERON, editors. Ciba Foundation Symposium, 1955. Boston: Little, Brown & Co. 396 pages. $9.00.

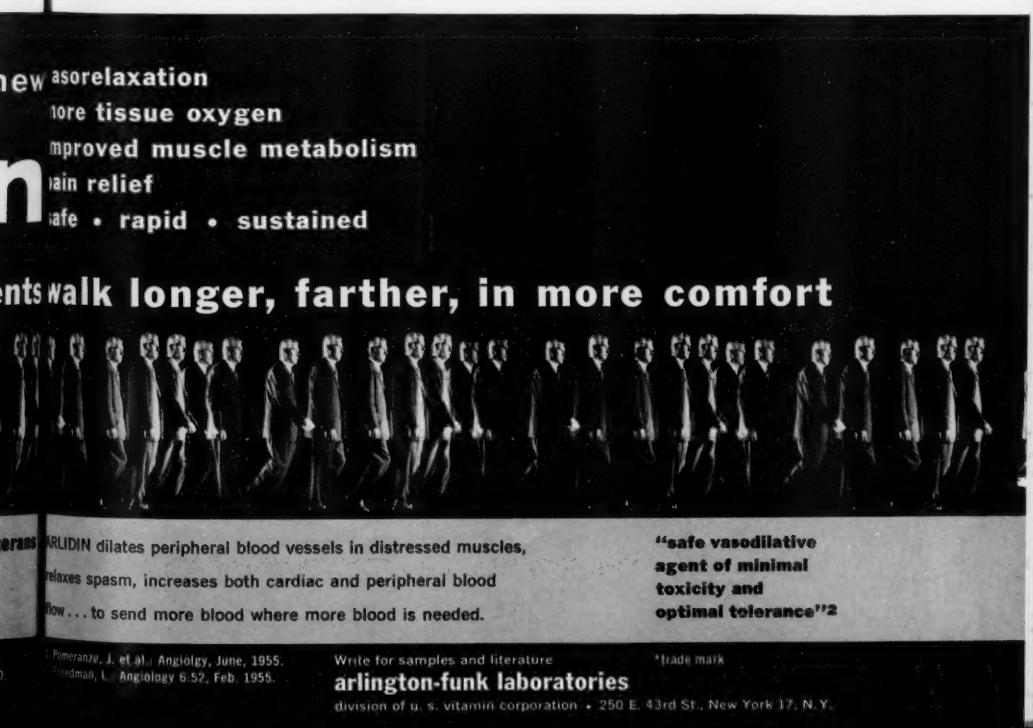
Geriatria Gerontologia Vejez. DR. JOSE FROIMOVICH, 1955. Valparaiso, Chile. 356 pages.

Psychiatric Research Reports. American Psychiatric Association Conference, 1955. Washington, D.C.: American Psychiatric Association, 152 pages.

Clinical Recognition and Management of Disturbances of Body Fluids. JOHN H. BLAND, 1956. Second edition. Philadelphia: W. B. Saunders. 522 pages. $11.50.

Group Discussion-Decision: An Appraisal of Its Use in Health Education. BETTY WELLS BOND, 1956. Minneapolis: Minnesota Department of Health. 109 pages.

A Psychiatric Approach to Institutional Work with the Aged. Community Service Society of New York, 1956. New York: National Committee on Aging, National Social Welfare Assembly. 44 pages. $.60.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Activities and Announcements . . .

Michigan Conference on Aging

The *University of Michigan's Ninth Annual Conference on Aging* will be held in Ann Arbor, July 9 through 11, 1956, on the topic, "Health for the Aging—Medical and Social Services."

General meetings will deal with health subjects of interest to all professional groups. In addition, the conference will offer clinics for medical, dental, and paramedical personnel.

Special attention will be given in one of the workshops to the geriatric training of medical and other personnel. For further information, write to Dr. Wilma Donahue, 1510 Rackham Building, Ann Arbor, Michigan.

•

International Meetings

The *Fourth Congress of the International Association of Gerontology* will be held in Merano, Italy, July 14 to 19, 1957. For registration forms and further information, write Segreteria, Quarto Congresso Internazionale de Gerontologia, Viale Morgagni, 85, Firenze, Italy. Additional information regarding the program will be found in later issues of *Geriatrics*.

The first *Pan American Gerontological Congress* will be held in Mexico City, September 15 to 22, 1956, with Dr. Manuel Payno, president of the Sociedad Mexicana de Geriatra, as presiding officer. Dr. E. V. Cowdry of Washington University is chairman of the North American Committee of Cooperation. There will be two simultaneous sessions of the Congress on (1) Medical and Biologic Aspects and (2) Social and Economic Aspects.

The *American Gerontological Society* will hold its ninth annual scientific meeting at the Hotel Morrison, Chicago, November 8 through 10, 1956. Abstracts of papers to be presented must be submitted in triplicate before June 15 to the appropriate section chairman. These include: biological sciences, Dr. James A. Hamilton, 450 Sutter Street, San Francisco, 2; clinical medicine, Dr. Arthur A. Hellbaum, University of Oklahoma School of Medicine, 801 N.E. 13 Street, Oklahoma City, 4; psychological and social sciences, Dr. James E. Birren, National Institute of Mental Health, Section on Gerontology, Bethesda 14, Maryland; and social work and administration, Miss Ollie A. Randall, 105 E. 22 Street, New York 10, N.Y.

(Continued on page 42A)

Dilaudid

the first thought for pain relief

Prescribe 1/20 gr. DILAUDID HCl Tablets or Ampules for Prompt Relief of Pain

- Pain relief without hypnosis
- Smooth, quick action
- Minimum of side effects
- An opiate, may be habit forming

•Dilaudid is subject to Federal narcotic regulations.
Dilaudid®, brand of Dihydromorphinone, a product of E. Bilhuber, Inc.

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Now-51 gauge elastic stockings

First to give proper remedial support and the sheerness women want

(they look like regular nylons)

Here at last are elastic stockings your patients will take to cheerfully. 51 gauge, made with threads twice as thin and twice as light as former kinds. So sheer they make "overhose" a thing of the past. Full-fashioned like regular nylons.

Yet, sheer as they are, Bauer & Black's 51 Gauge Elastic Stockings provide proper remedial support. Pressure decreases gradually from the ankle up, gently speeding venous flow.

New Full-foot Style

These full-footed stockings can be worn all day, everyplace your patient may go. Made with Helanca® stretch nylon in heel and toe so they won't cramp or bind.

You can be *sure* of patient cooperation, doctor, when you prescribe these stockings.

Of course, your patients can still choose from the complete Bauer & Black line: nylon or cotton . . . open toe or closed toe . . . knee length, above knee or extra long . . . variety of prices.

51 gauge elastic stockings

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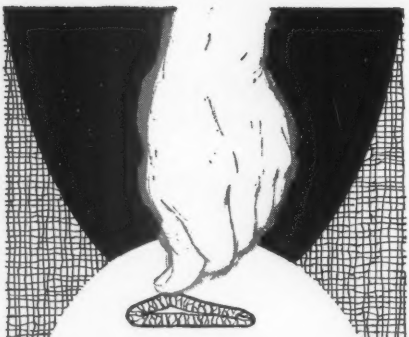

To counteract

corticoid-induced adrenal atrophy during corticoid therapy, *routine support* of the *adrenals with ACTH is recommended.*

THIS IS THE PROTECTIVE DOSAGE RECOMMENDATION FOR COMBINED CORTICOID-ACTH THERAPY

- When using *prednisone* or *prednisolone:* for every 100 mg. given, inject approximately 100 to 120 units of HP* ACTHAR *Gel.*
- When using *hydrocortisone:* for every 200 to 300 mg. given, inject approximately 100 units of HP* ACTHAR *Gel.*
- When using *cortisone:* for every 400 mg. given, inject approximately 100 units of HP*ACTHAR *Gel.*

Discontinue administration of corticoids on the day of the HP*ACTHAR *Gel* injection.

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(IN GELATIN)

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*Highly Purified

Unsurpassed in Safety and Efficacy
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Activities and Announcements . . .

(Continued from page 40A)

Summer Workshop

The Summer Workshop in Adult Education which will be held in Santa Barbara, California, July 19 to 28, will give special attention to the role of education in the aging process, with a special section on education and the senior citizen. Since the group will be limited in size to ensure its effectiveness, those interested should write early to Dr. George C. Mann, chief of the Bureau of Adult Education, State Department of Education, 722 Capitol Avenue, Sacramento 14, for details.

•

Architectural Competition in Homes for the Aged

The National Social Welfare Assembly, Inc. is sponsoring an architectural competition in homes for the aged. This contest is made possible by a grant from the Frederick and Amelia Schimper Foundation. All drawings submitted in the contest must be received by October 1. First prize is $5,000 with five additional prizes ranging from $2,500 to $500.

•

Correspondence Course

The University of Chicago offers a correspondence course entitled "Making the Most of Maturity" which is designed to help men and women over 45 make the best possible use of their resources, physical, mental, financial and social.

•

Research Grants

Applications for support of studies in or related to the cardiovascular field are now being accepted by the American Heart Association. The awards would be for the fiscal year beginning July 1, 1957. Application deadline for research fellowships and established investigatorships is September 15, 1956. For grants-in-aid, applications must be made by November 1, 1956.

The Public Health Service has announced a new procedure to expedite processing of research grant applications for those requests which do not exceed $2,000 plus indirect costs and which do not ask support for more than one year. Address all applications as well as requests for forms or additional information to the Division of Research Grants, National Institutes of Health, Bethesda 14, Maryland.

•

Retirement Village

Building has started on Salhaven, a retirement village and convalescent hospital for members of the Upholsterers' International Union in Palm Beach County, Florida. Tentative date for admission of residents is November 1, 1956.

IN DIABETES...

greater security against vascular complications

Increased threat of vascular complications in diabetic patients can result from recurring episodes of inadequate control; at such times amino acids are "wasted" by de-amination in the liver and normal dietary security against lipotropic deficiency fades.

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Gericaps

(Sherman Lipotropic Capsule) **One capsule t.i.d.**

Gericaps contain the true lipotropics, choline and inositol, which are unaffected by de-amination in the liver. Three capsules daily provide the equivalent of 3 Gm. choline dihydrogen citrate.

This dose also provides 60 mg. rutin and 37.5 mg. ascorbic acid to maintain or improve capillary integrity, as well as 3000 units vitamin A, 3 mg. thiamine hydrochloride, 3 mg. riboflavin, 12 mg. niacinamide, 0.75 mg. pyridoxine hydrochloride, and 3 mg. calcium pantothenate.

SEND FOR comprehensive review:
"Prevention of Vascular Complications of Diabetes"

SHERMAN LABORATORIES
BIOLOGICALS • PHARMACEUTICALS
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At Last...

UNIFORM DOSAGE NEBULIZATION in Asthma

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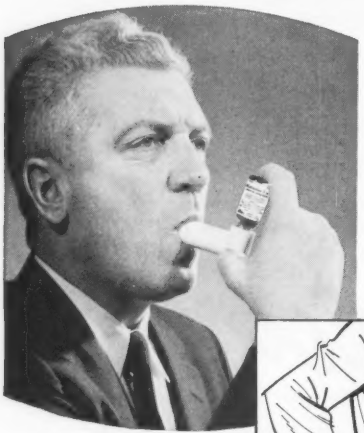

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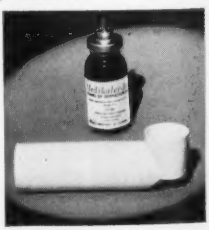
- NO RUBBER BULBS TO DETERIORATE
- NO BREAKAGE OF COSTLY GLASS NEBULIZERS
- NO SPILLING OF SOLUTION IN POCKET OR PURSE

True nebulization—one inhalation provides 5 to 8 times as many particles in the ideal size range—0.5 to 4 microns radius—as an inhalation from standard nebulizers. Amount of medication released does not depend on pressure applied—dosage always the same. One application usually sufficient for most patients.

So easy to "assemble"—simply place bottle, valve downward, into Adapter—so easy to use—so rapidly effective—and so convenient to carry in pocket or purse.



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0.5% solution of epinephrine U.S.P.

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0.25% solution of isoproterenol HCl U.S.P.

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Rx Medihaler-Iso and Medihaler Oral Adapter

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Against Disease and Discomfort

in urinary tract infections

Azo Gantrisin, in one tablet, combines Gantrisin with a widely-used urinary tract analgesic. The high plasma and urine levels achieved by Gantrisin effectively combat urinary infections both systemically and locally. The rapid local action of the analgesic dye is reflected by the early appearance of an orange-red color in the urine.

Each Azo Gantrisin tablet contains 0.5 Gm Gantrisin 'Roche' plus 50 mg phenylazo-diamino-pyridine HCl.

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For patients harried by hurry and worry —

Noludar 'Roche' brings calm and quiet. Not a barbiturate, not habit forming, 50 mg t.i.d. provides daytime sedation with little or no loss of acuity, or 200 mg h.s. induces a sound night's sleep with a refreshed and clear-headed awakening. Noludar tablets, 50 and 200 mg; elixir, 50 mg per teaspoonful. Hoffmann-La Roche Inc, Nutley, New Jersey.

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Relax

the nervous,

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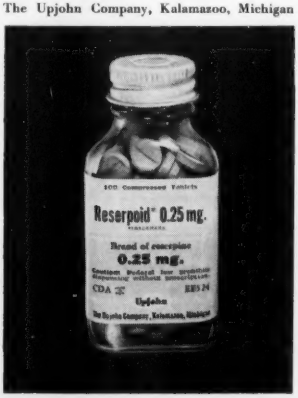

Digests FROM CURRENT LITERATURE

(Continued from page 36A)

Psychotherapy with Aged Persons: Patterns of Adjustment in a Home for the Aged

A. I. GOLDFARB. Ment. Hyg. 39: 608-621, 1955.

A psychiatrist in an institution or home for the aged is often called upon to help with so-called maladjusted individuals. Residence in a home for the aged is modification of an individual's way of life in response to a need. This modification is intended to be therapeutic or helpful. It is a societal response to community and individual need.

The home receives persons who have lost economic, social, physical, and often mental resources. The psychiatrist, in his interview with an aged person, assays what has been propelled through the selective screen and evaluates the person in terms of social background, family setting, and present physical, emotional, and psychological status.

The home is a psychotherapeutic institution on a grand scale. The institution offers a total-push program—protection, medical care, adequate nutrition, occupational therapy, graded degrees of responsibility, individual counselors, and group projects. Adjustment of the resident is not only a matter of how he adapts to his environment, but also of how staff members and the institution respond to and interact with the resident.

Experimental Prolongation of the Life Span

C. M. MC CAY, F. POPE, and W. LUNSFORD. Bull. New York Acad. Med. 32: 91-101, 1956.

The life span and senescent diseases of the common white rat can be favorably altered by a diet deficient in calories but adequate in vitamins, minerals, fats, and essential amino acids. Although animals thus retarded never attain normal adult size, their life span is substanially increased and often doubled. Males and females have equal life spans; whereas, in a normal group, females tend to live longer. Few neoplasms develop in these longer surviving retarded rats; normal incidence is 12 per cent. While bones and eyes age at the normal rate, fur and skin appear to age more slowly. Males are generally sterile; females have a diminished reproductive capacity.

Other studies under normal conditions show that large rats tend to live longer than animals of smaller size. Prevention of obesity by restriction of food intake or exercise lengthens the life span.

The technic of parabiosis, in which pairs of rats are sutured together so that the animals have a common capillary circulation, may have some use in fundamental studies of aging. By the union of old and young rats it may be possible to determine whether a young animal has substances in its blood that can rejuvenate the old, or whether the blood of the old can produce aging in the young.

(Continued on page 48A)

Correct
constipation . . .
Restore
HABIT TIME
of bowel
movement
PETROGALAR®
Aqueous Suspension of Mineral Oil, Plain
Wyeth®
Philadelphia 1, Pa.
Bottles of 1 pint

If your special diet patient tables your food specifications . . .

most likely mealtime has become a distasteful chore instead of a delightful duty. You can often encourage a stubborn eater to stay with your diet by offering wider food variety—more palatable menus. Gerber's 4 Cereals, over 70 Strained and Junior (minced) Foods give you greater latitude in making substitutions for "picky" eaters. Specially processed to preserve true colors and tempting flavors—reduce crude fiber to a minimum.

GOOD SUBJECT MATTER FOR YOU AND YOUR PATIENTS

New ways to brighten bland diets—Gerber's "Special Diet Recipes"—over 96 easy-to-fix dishes, properly indexed for Bland Soft, Mechanically Soft, Liquid and Low-Residue diets. For free copies, write on your letterhead to Dept. JG7-6, Fremont, Michigan.

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CEREALS, STRAINED & JUNIOR FOODS

Digests FROM CURRENT LITERATURE

(Continued from page 46A)

Cholecystectomy in Patients with Coronary Artery Disease

J. R. KEYS, T. J. DRY, W. WALTERS, and R. P. PAGE. Proc. Staff Meet., Mayo Clin. 30: 587-595, 1955.

Coronary heart disease is not a serious contraindication to surgery for chronic cholecystic disease. Inasmuch as biliary colic is known to aggravate an existing coronary insufficiency, the reasonable assumption would be that cholecystectomy may influence favorably the subsequent course of the heart disease. Another common assumption is that cholecystectomy in the presence of chronic coronary disease is attended with considerable surgical risk. The present report reveals these two assumptions to be incorrect.

Over a period from 1948 to 1952, cholecystectomy was performed in 100 patients, 64 men and 36 women, ranging in age from 38 to 79 years, who had had signs and symptoms of coronary heart disease but who were without a recent episode of acute myocardial infarction. A history consistent with angina pectoris was present in 80 per cent of the patients, a history of previous myocardial infarction in 31 per cent, and electrocardiographic abnormality in 70 per cent.

Stones were found in 99 per cent of patients, common duct stones in 20 per cent, and acute cholecystitis in 6 per cent. During surgery the anesthesiologist always kept a high percentage of oxygen in the anesthetic mixture. Intravenous fluids were administered with caution.

Acute myocardial infarction occurred in 1 patient and signs and symptoms of acute coronary insufficiency in 2; all 3 recovered. Three men patients, aged 63, 72, and 79 years, died postoperatively from hemorrhagic pancreatitis, pancreatic necrosis, and cerebrovascular accident. Hence, 2 of the 3 deaths were caused by complications of biliary tract disease.

Analyses of the various morbidities and the long-term follow-up reveal that the incidence of postoperative complications is similar to that which occur in the older age group requiring abdominal surgery. The hazards of untreated chronic cholecystic disease is greater than the risk of operation. The subsequent course of coronary artery disease is unaffected by cholecystectomy.

FOR OLDER PATIENTS... *Soothing Relief* IN CHRONIC URINARY INFECTIONS

Urolitia can be given over long periods . . . without toxicity, without irritation, without drug fastness . . . to keep the urine free from E. coli, S. albus, S. aureus. . . . Promptly soothes the irritated membrane while providing bacteriostasis.

DOSE:
One tbs. in half cup warm water, q.i.d., ½ hr. a.c. and h.s.

Urolitia — METHENAMINE URINARY ANTISEPTIC

Sample on request

Cobbe Div., BORCHERDT MALT EXTRACT CO.,
217 N. Wolcott Ave., Chicago 12, Ill.

Effective local treatment

FOR BEDSORES AND OTHER CHRONIC ULCERATIONS

May 15th. Severe decubitus ulcer over femoral greater tuberosity in a terminally ill patient.

WHITE'S VITAMIN A & D OINTMENT

Routine application of White's Vitamin A & D Ointment promotes granulation and epithelization in *stubborn bedsores, chronic ulcers of varied etiology, burns and slow-healing wounds* that do not permit primary surgical closure. It is also useful as a protective and therapeutic covering in miscellaneous skin conditions characterized by abnormal dryness. White's Vitamin A & D Ointment provides vitamins A and D in a pleasant lanolin-petrolatum base that does not stain tissues or bed clothes.

℞ in 1½ oz. or 4 oz. tubes;
1 lb. or 5 lb. jars.

July 12th. After 2 months of treatment with White's Vitamin A & D Ointment, ulcer crater reveals healthy granulation tissue

White's

WHITE LABORATORIES, INC., KENILWORTH, N. J.

HOW OLD IS OLD?

"The really old people are those 10 years older than myself."[1]

"In the lay mind, anyone past 60 is ready for the discard . . ."[2]

". . . there are only three principal phases in the span of life: infancy, adolescence and senescence."[3]

"One finds alert, interesting, active folks in the 80's and, on the other hand, there are people in the 20's and 30's who have all the characteristics of old age."[4]

THE REAL QUESTION

To the physician on the firing line of daily practice, the question of "how old is old?" seems academic. To him, a more valid question is "How can I allay the effects of the aging process?"

FIVE PROBLEMS IN AGING

The answer, according to most authorities, is manifold, for five treatable problems seem to predominate. One, obviously, is gonadal hormone decline. Another is mild anemia. A third is the decreased production of gastric and digestive enzymes. Mineral-vitamin deficiency is the fourth. And the fifth – perhaps most important – is inadequate high-quality protein intake.

THERAPY FOR AGING

Judging from this confused clinical picture of aging, therapy for the problem would appear difficult. However, most physicians agree that a product which could correct most or all of these five commonest problems would remove past obstacles to satisfactory response. Such a product would, essentially, be true "preventive geriatrics."

NEOBON'S COMPREHENSIVE FORMULA

NEOBON®, a product of Roerig research, is a blended combination of the five most commonly indicated factors for prevention or treatment of the nonacute conditions of aging. Each soft, soluble capsule provides:

Non-stimulatory gonadal hormone replacement

balanced hematinic component

digestant enzyme replacement

specially formulated mineral-vitamin combination

new lysine, for protein improvement*

* Protein deficiency among the aging apparently stems from their excessive intake of white-flour foods which furnish incomplete protein of low biologic value. White bread protein, for example, has been shown by nutrition studies in animals[5] to be deficient only in the amino acid, lysine. In human subjects metabolic determinations indicate that the addition of supplemental lysine to a basal white-flour protein diet can convert a negative nitrogen balance into a positive one.[6]

A WORD ABOUT SYMPTOMATOLOGY

In spite of jokes to the contrary, the patient who states in the professional office that "old age is creeping up" is a rare bird indeed.

Seldom is old age the presenting complaint. Thus the physician, after correcting the specific complaints, must re-evaluate the whole person to judge his candidacy for "preventive geriatrics." Such people have much to gain from NEOBON therapy. The rewards are fuller, more active, more pleasurable years for patients past 40. The daily dose (3 capsules) of NEOBON provides:

L-lysine	150 mg.
Methyltestosterone	3 mg.
Ethinyl Estradiol	0.018 mg.
Pancreatic Substance***	150 mg.
Glutamic Acid	90 mg.
Rutin	15 mg.
Vitamin A (Palmitate)	6,000 U.S.P. Units
Vitamin D (Irradiated Ergosterol)	600 U.S.P. Units
Vitamin E (as Tocopheryl Acetate)	15 I.U.
Calcium Pantothenate	15 mg.
Thiamine Mononitrate (Vitamin B_1)	1.5 mg.
Riboflavin (Vitamin B_2)	1.5 mg.
Pyridoxine Hydrochloride (Vitamin B_6)	1.5 mg.
Niacinamide	150 mg.
Ascorbic Acid (Vitamin C)	150 mg.
Vitamin B_{12} (Oral Concentrate)	3 mcg.
Folic Acid	0.3 mg.
Liver-Stomach Substance**	300 mg.
Iron (from Ferrous Gluconate)	10.2 mg.
Cobalt (from Cobaltous Sulfate)	0.1 mg.
Molybdenum (from Sodium Molybdate)	2 mg.
Copper (from Cupric Sulfate)	1 mg.
Manganese (from Manganous Sulfate)	1 mg.
Magnesium (from Magnesium Sulfate)	6 mg.
Iodine (from Potassium Iodide)	0.15 mg.
Potassium (from Potassium Sulfate)	5 mg.
Zinc (from Zinc Sulfate)	1.2 mg.

**Enzymatically active defatted material obtained from 1,500 mg. whole fresh liver and stomach.

***Enzymatically active defatted material obtained from 750 mg. of whole fresh pancreas.

Dosage: 3 capsules daily, with meals.

Supplied: Bottles of 60 capsules, prescription only.

NEW NEOBON® LIQUID

A GERIATRIC TONIC

Now also available for your consideration is NEOBON LIQUID, which provides hematinic action, improved carbohydrate and protein utilization, gonadal and thyroid hormone supplementation and a mild antidepressant action.

The pleasant tasting liquid is especially indicated when a combined attack against nutritional, physiological and mental depression is indicated. Each teaspoonful (5 cc.) of pleasant-tasting NEOBON LIQUID contains:

Ferrous Gluconate	30 mg.
Ascorbic Acid	50 mg.
d-Amphetamine Sulfate	0.5 mg.
Folic Acid	167 mcg.
Vitamin B_{12}	2.5 mcg.
l-Thyroxine	0.1 mg.
Ethinyl Estradiol	1 mcg.
Methyltestosterone	1 mg.
Liver Fraction I	25 mg.
Ethyl Alcohol	0.5 cc.

Dosage: One teaspoonful twice daily before meals, or as required.

Supplied: In 16 fluid ounce bottles, prescription only.

Bibliography

1. Anonymous. 2. Rosenthal, P.: Geriatrics 10:382 (August) 1955. 3. Lansing, A. I.: Symposium on Problems of Gerontology, National Symposium Series No. 9 (August) 1954. 4. Mason-Hohl, E.: Quoted in W. Va. Med. J. 51:16 (January) 1955. 5. Rosenberg, H. R., et al.: Arch. Biochem. and Biophys. 49:263, 1954. 6. Bricker, M., Mitchell, H. H. and Kinsman, G. M.: J. Nutrition 30:269, 1945. 7. Masters, W. H. and Ballew, J. W.: Geriatrics 10:1, 1 (January) 1955.

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No. 483—Cloth Cover—white only.

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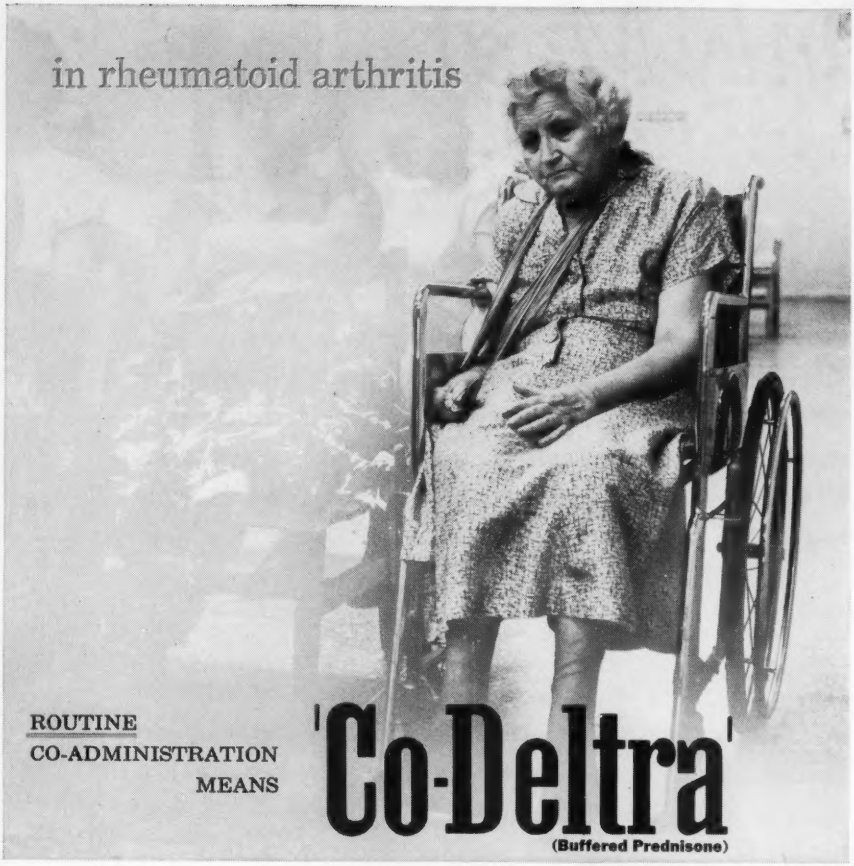
in rheumatoid arthritis



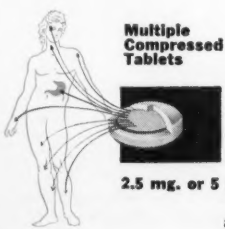
ROUTINE
CO-ADMINISTRATION
MEANS

'Co-Deltra'

(Buffered Prednisone)

'Co-Hydeltra'

(Buffered Prednisolone)



Multiple Compressed Tablets

Clinical evidence[1, 2, 3] indicates that to augment the therapeutic advantages of prednisone and prednisolone, antacids should be *routinely* co-administered to minimize gastric distress.

2.5 mg. or 5 mg. prednisone or prednisolone with 50 mg. magnesium trisilicate and 300 mg. aluminum hydroxide gel.

References: 1. Boland, E. W., *J.A.M.A.* **160**:613, February 25, 1956. 2. Margolis, H. M., *et al. J.A.M.A.* **158**:454, June 11, 1955. 3. Bollet, A. J., *et al. J.A.M.A.* **158**:459, June 11, 1955.

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Each contains 0.03 Gm (½ grain) of Alurate per teaspoonful (4 cc)
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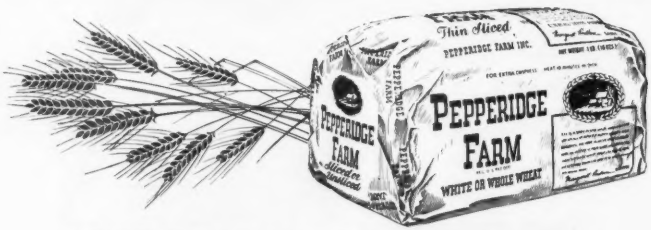

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DEPROTEINATED PANCREATIC EXTRACT

promptly relieves smooth muscle spasm

MAJOR ADVANTAGES: Physiologic relief of pain. Non-narcotic. Non-toxic.

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DEPROPANEX, by relieving smooth muscle spasm, is valuable in ureteral, renal and biliary colic and in various urologic instrumental procedures.

Intermittent claudication is markedly improved with DEPROPANEX.[2, 3] DEPROPANEX is also valuable in the control of paralytic ileus following abdominal surgery.

That DEPROPANEX has "beneficial effect... throughout the post-operative period has been convincingly demonstrated."[4] There is less nausea, little need for intravenous fluids, for nasal suction or enemas.[4]

Dosage of DEPROPANEX is 2 to 5 cc. It is *supplied* in 10 cc. and 30 cc. rubber-capped vials.

References: 1. South. M. J. 31:233 (March) 1938. 2. Bull. New York Acad. Med. 19:478 (July) 1943. 3. Am. Heart J. 18:425 (Oct.) 1939. 4. Minnesota Med. 33:1102 (Nov.) 1950.

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Persistin, a tablet manufactured by Sherman Laboratories, Detroit, combines acetylsalicylate, which is quickly absorbed, and salicylsalicylate, which is insoluble in gastric secretions, resulting in delayed absorption. It is indicated for relief of pain during hours of sleep; arthritic and rheumatic involvements, bursitis, myalgias, neuralgias, and other types of pain relieved by salicylates; and fever and distress of upper respiratory and other infections. Analgesic levels of salicylate persist in the blood for five to eight hours following a single dose.

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[1]Levy, S.: J.A.M.A., 153:1260-1265, 1953.

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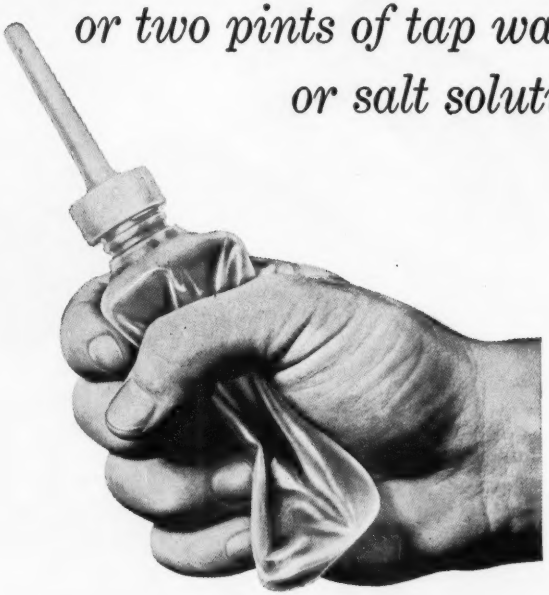
more effective than one
or two pints of tap water
or salt solution



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DOSE: 1 or 2 tablets after each meal and at bedtime. METAMINE, 2 mg., bottles of 50 and 500; METAMINE (2 mg.) WITH BUTABARBITAL (¼ gr.). Bottles of 50.

*1. Poumailloux, M., and Tetreau, H.: Official Report to Medicaments Trials Commission (France), 1949. 2. Dailheu-Geoffroy: La Clinique, *46*:27, May 1951. 3. Spuehler, O.: Schweiz. Med. Wochschr., *11*:518, 1949. 4. J-F Merlen: Therapie, *6*:223, 1951. 5. Palmer, J. H., and Ramsey, C. G.: Canad. M.A.J., *65*:16, July 1951; Current Med. Digest, *18*:94, October 1951. 6. Fuller, H. L., and Kassel, L. E.: Metamine (triethanolamine trinitrate biphosphate) in Angina Pectoris, J.A.M.A., *159*:1708-1713, December 31, 1955.

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Pioneer soy alternative to milk... reported to be "noticeably more soothing to the upper gastrointestinal tract and seemingly easier to digest."[1] Comparable to milk in buffering[2] and nutritional[3] qualities. Contains no cholesterol... and costs the patient *much* less than milk-and-cream. Easy to prepare—4 level tablespoonfuls to 8 oz. water. In 1-lb. tins at all drug outlets.

1. Balfour, D. C., Jr.: Am. J. Gastroenterol. 22:181, 1954. 2. Burke, J. O., et al.: Internat. Rec. Med. & Gen. Practice Clin. 167:587, 1954. 3. Sternberg, S. D., and Greenblatt, I. J.: Ann. Allergy 9:190, 1951.

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